AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

Engineering Library

MAY 27 1918.

UNIV. OF MICH. LIBRARY

Vol. XXXVIII
No. 21

NEW YORK, MAY 23, 1918

Ten cents a copy
Three dollars a year

Strom
BEARINGS
FORMERLY U.S. BALL BEARINGS

U. S. BALL BEARING
MANUFACTURING CO.
(Conrad Patent Licensee)
Palmer Street and Kolmar Avenue
CHICAGO . . . . . ILL.

Editorial Contents, page 3

Advertisers' Index—Next to last page

JOHNSON'S HASTEE PATCH

A Quick and Permanent Repair

FOR TUBES AND CASINGS

JOHNSON'S HASTEE PATCH is a quick and permanent repair for tubes, casings and rubber goods of all kinds. No time, labor or heat required. An ordinary sized patch can be applied in two minutes—and it's so simple that a child can use it. Johnson's Hastee Patch is much more satisfactory than vulcanizing because there is no danger of burning and spoiling the tube.

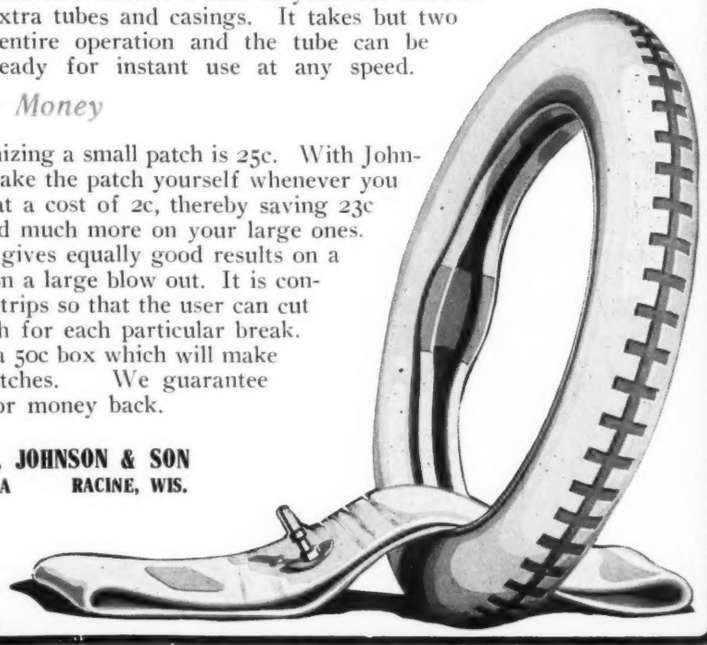
Cut Down Your Tire Investment

If you'll carry a box of Johnson's Hastee Patch in your tool kit you can get away from the expense of a lot of spare tubes and casings which fast deteriorate during the hot motoring months. A box of Johnson's Hastee Patch in your car answers the same purpose as two or three extra tubes and casings. It takes but two or three minutes to perform the entire operation and the tube can be pumped up immediately and is ready for instant use at any speed.

Saves Money

The minimum charge for vulcanizing a small patch is 25c. With Johnson's Hastee Patch you can make the patch yourself whenever you have a minute's time—and at a cost of 2c, thereby saving 23c on your smallest patch and much more on your large ones. Johnson's Hastee Patch gives equally good results on a pin hole puncture or on a large blow out. It is conveniently put up in strips so that the user can cut the right size patch for each particular break. Use coupon for a 50c box which will make 25 average patches. We guarantee satisfaction or money back.

S. C. JOHNSON & SON
Dept. A RACINE, WIS.



S. C. JOHNSON & SON, Dpt. A, RACINE, WIS.

I enclose 50c for which please send me by prepaid parcel post a 50c box of Johnson's Hastee Patch which I understand contains a strip from which 25 ordinary size patches may be cut. Also send me booklet entitled "Keep Your Car Young."

Name .....

Address .....

City and State .....

My Dealer is .....

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XXXVIII NEW YORK—THURSDAY, MAY 23, 1918—CHICAGO NO. 21

Aircraft Board Reorganized by President

Ryan and Kenly in Charge—Signal Corps Loses All Jurisdiction Over Aircraft Activities—1000 Liberty Engines Completed —Over 100 Battleplanes Shipped—Signing of Overman Bill Cleared Way for Reorganization

NEW YORK CITY, May 22—As soon as President Wilson signed the Overman Bill on May 20, it was possible for him to proceed with the reorganization of the aircraft activities, and this has been carried out in accordance with plans announced some weeks ago.

The main thought in the reorganization is that those in charge are given power as compared with Howard E. Coffin, former chairman, who had an advisory position only. Under the reorganization, the Signal Corps has been robbed of every vestige of power relating to aviation and aircraft matters. Major-General Geo. O. Squier, who as Chief Signal Officer of the army was the head of aviation activities, has now nothing whatever to do with the work.

In the reorganization there are two divisions of aircraft activity: There is the Bureau of Aircraft Production, which is headed by John D. Ryan, the copper operator, and who is the successor to Mr. Coffin. The other department is the Bureau of Military Aeronautics, which has to do with the complete training of men for the service and is under Brig.-Gen. William L. Kenly. His duties include the operation and also the maintenance of military aircraft.

Mr. Ryan, as head of the Bureau of Production, has complete jurisdiction over the production of airplanes, airplane engines, and all equipment necessary. By this division of the field, Chairman Ryan has charge of manufacturing and Gen. Kenly takes charge after they are completed.

All of the unexpended aircraft appropriations heretofore made for the Signal Corps and specifically allotted for use in connection with aviation have been transferred. The funds for the operation and maintenance of airplanes go under the jurisdiction of Gen. Kenly and those for production come under the control of John D. Ryan.

It is quite likely that in addition to these two aircraft divisions, the one controlling production, the other controlling operation and maintenance, there will in the near future be established the third joint division comprising the best engineers in both sections for the purpose of securing the most competent designing and engineering advices.

The completion of the one thousandth Liberty aviation engine on May 17 comes as good evidence of what had previously been accomplished under the poorly organized Aircraft Production Board and this production figure adds much credit to those who have had the work in charge and is satisfactory proof that Liberty engine production and the Liberty engine, as a powerplant, are up to the standards that AUTOMOTIVE INDUSTRIES has been crediting them with from week to week.

The old organization laid the foundation and got the production machinery working. It is a wonderful accomplishment to have conceived, designed and produced such an aviation engine in this quantity within 10 months from the date of its conception. As the report from the British War Cabinet, published last week in AUTOMOTIVE INDUSTRIES, said, it generally requires more than a year from the time that an engine is laid out on paper until it gets into production. Within 10 months we have not only gotten into production but have completed the first thousand.

At this writing, Packard and the Lincoln Motors are in production. Cadillac and Buick are practically getting into production. Marmon has been completing the final

test of this engine before starting in production. The exact status of the Ford factory is not known, but it is reported that Henry Ford has organized a force of 1200 toolmakers in order to hasten production.

Not only is the former Aircraft Production Board deserving of credit for the actual production of Liberty engines, but the work of the Board is well evidenced by plane production. The Dayton-Wright Airplane Co. had shipped a few days ago 104 complete De Haviland battleplanes fitted with Liberty engines. These planes carry a pilot and gunner. They are fitted with two machine guns. For these 104 planes shipped, there are spares for seventy-one additional so that the shipment of 104 battleplanes is equivalent to 175.

This factory is by far the farthest advanced in plane production, but its production has been held up for months because of delays on the equipment for the planes which had to come through the Signal Corps and over which the factory had no control. It has been held up for months waiting for machine-gun mountings. Last week it was help up because the Signal Corps had failed to order certain types of radiators that were supposed to have been ordered. These planes are now being shipped without air-speed indicators or bombing attachments. There has been very much delay in connection with the development of the many equipments which go with the planes.

This factory last week produced forty-five of these De Haviland battleplanes which with the necessary spares equalled an output of 75 complete planes. The week previous, production was thirty-two planes, to which must be added spares; and the week previous to that twenty-seven, which with spares would make fifty-four. The production to-day is approximately twelve planes per day which with spares is equal to twenty planes.

The question of aircraft investigation is still somewhat unsettled and Congress, which was very defiant on this subject, is rapidly acceding to the demands of the administration. It is most likely that there will be no investigation as originally proposed by Senator Chamberlain, but there may be Senatorial investigation.

Charles E. Hughes, appointed last week to investigate the aircraft situation, has been in Washington in conference with Attorney-General Gregory and will maintain his headquarters at the Department of Justice. Mr. Hughes intends to go into the matter deeply and has been promised the thorough co-operation of every Government facility.

Displaying a disregard for the Borglum denunciatoins of Col. E. A. Deeds and others in the Aircraft Board and Signal Corps, Secretary of War Newton D. Baker yesterday detached Cols. E. A. Deeds, S. D. Waldon and R. L. Montgomery from their present duties in connection with aviation. He directed them to report to the Attorney-General for such co-operation and assistance as they could render in the aviation investigation which the Department of Justice has undertaken.

This places these aircraft officers practically in the position to investigate themselves. It portrays Secretary Baker holding the Borglum charges in contempt. It will possibly give the Borglum adherents the chance to claim that Secretary Baker is furthering opportunities for his so-called "pro-German advisors." It may be that the secretary desires to show impartiality and, anxious to keep clear the reputation of those men, has detached them from service ostensibly to aid the investigation, actually to hold them in reserve until the findings of the investigation are made public.

Col. Deeds has been an executive assistant to aircraft production under Maj. Gen. Squiers, Chief Signal Officer, and a member of the Aircraft Production Board. Col. Montgomery acted under Gen. Squiers and Col. Deeds and was also a member of the Aircraft Board. Col. S. D. Waldon, who assisted in framing the aircraft program, was in France under Brig. Gen. Frulois and more recently was assigned to the general staff as a representative of the Aviation Section of the Signal Corps.

With regard to the reorganization of the aircraft field, the complete order of President Wilson follows:

The President's Order Reorganizing Aircraft Activities

BY virtue of the authority in me vested as Commander-in-Chief of the Army and by virtue of further authority upon me specifically conferred by "An Act authorizing the President to co-ordinate or consolidate executive bureaus, agencies and offices, and for other purposes, in the interest of economy and the more efficient concentration of the Government," approved May 20, 1918, I do hereby make and publish the following order:

I.

The powers heretofore conferred by law or by executive order upon, and the duties and functions heretofore performed by, the Chief Signal Officer of the Army are hereby redistributed as follows:

(1) The Chief Signal Officer of the Army shall have charge, under the direction of the Secretary of War, of all military signal duties, and of books, papers, and devices connected therewith, including telegraph and telephone apparatus and the necessary meteorological instruments for use on target ranges, and other military uses; the construction, repair and operation of military telegraph lines, and the duty of collecting and transmitting information for the Army by telegraph or otherwise and all other duties usually pertaining to military signaling; and shall perform such other duties as now are or shall hereafter be devolved by law or by executive order upon said Chief Signal Officer, which are not connected with the Aviation Section of the Signal Corps or with the purchase, manufacture, maintenance and production of aircraft, and which are not hereinafter conferred, in special or general terms, upon other officers or agencies.

(2) A Director of Military Aeronautics, selected and designated by the Commander-in-Chief of the Army, shall hereafter have charge, under the direction of the Secretary of War, of the Aviation Section of the Signal Corps of the Army, and as such shall be, and he hereby is, charged with the duty of operating and maintaining or supervising the operation and maintenance of all military aircraft, including balloons and airplanes, all appliances pertaining to said aircraft and signaling apparatus of any kind when installed on said aircraft, and of training officers, enlisted men and candidates for aviation service in matters pertaining to military aviation, and shall hereafter perform each and every function heretofore imposed upon and performed by the Chief Signal Officer of the Army in, or in connection with, the Aviation Section of the Signal Corps, except such as pertains to the purchase, manufacture and production of aircraft and aircraft equipment and as is not hereinafter conferred, in special or general terms, upon the Bureau of Aircraft Production; and all airplanes now in use or completed and on hand and all material and parts, and all machinery, tools, appliances and equipment held for use for the maintenance thereof; all lands, buildings, repair shops, warehouses, and all other property real, personal or mixed, heretofore used by the Signal Corps in, or in connection with, the operation and maintenance of aircraft and the training of officers, enlisted men and candidates for aviation service, or procured and now held for such use by or under the jurisdiction and control of the Signal Corps of the Army; all books, records, files and office equipment heretofore used by the Signal Corps in, or in connection with, such operation, maintenance and training; and the entire personnel of the Signal Corps as at present assigned to, or engaged upon, work in, or in connection with, such operation, maintenance and training is hereby transferred from the jurisdiction of the Chief Signal Officer and placed under the jurisdiction of the Director of Military Aeronautics; it being the intent hereof to transfer from the jurisdiction of the Chief Signal Officer to the jurisdiction of the said Director of Military Aeronautics every function, power and duty conferred and imposed upon said Director of Military Aeronautics by sub-paragraph (2) of paragraph 1 hereof, all property of every sort or nature used or procured for use in, or in connection with, the functions of the Aviation Section of the Signal Corps placed in charge of the Director of Military Aeronautics by sub-paragraph (2) of paragraph 1 hereof, and the entire personnel of the Signal Corps as at present assigned to, or engaged

upon, work in, or in connection with, the performance of the functions and duties of the Aviation Section of the Signal Corps placed in charge of the Director of Military Aeronautics by sub-paragraph (2) of paragraph 1 hereof.

An Executive agency, to be known as the Bureau of Aircraft Production, is hereby established, and said agency shall exercise full, complete and exclusive jurisdiction and control over the production of airplanes, airplane engines and aircraft equipment for the use of the Army, and to that end shall forthwith assume control over and jurisdiction over all pending Government projects having to do, or connected, with the production of airplanes, airplane engines and aircraft equipment for the Army and heretofore conducted by the Signal Corps of the Army, under the jurisdiction of the Chief Signal Officer; and all material on hand for such production, all unfinished airplanes and airplane engines and all unfinished, unattached, or unassembled aircraft equipment; all lands, buildings, factories, warehouses, machinery, tools and appliances and all other property, real, personal or mixed, heretofore used in, or in connection with, such production, or procured and now held for such use, by or under the jurisdiction and control of the Signal Corps of the Army; all books, records, files and office equipment used by the said Signal Corps in, or in connection with, such production; all rights under contracts made by the Signal Corps in, or in connection with, such production, and the entire personnel of the Signal Corps as at present assigned to, or engaged upon, work in, or in connection with, such production, are hereby transferred from the jurisdiction of the Signal Corps and placed under the jurisdiction of the Bureau of Aircraft Production; it being the intent hereof to transfer from the jurisdiction of the Signal Corps to the jurisdiction of the said Bureau of Aircraft Production every function, power and duty connected with said production, all property, of every sort or nature used or procured for use in, or in connection with, said production, and the entire personnel of the Signal Corps, as at present assigned to, or engaged upon, work in, or in connection with, such production.

Such person as shall at the time be Chairman of the Aircraft Board created by the Act of Congress approved Oct. 1, 1917, shall also be the executive officer of said Bureau of Aircraft Production, and he shall be, and he hereby is, designated as Director of Aircraft Production, and he shall, under the direction of the Secretary of War, have charge of the activities, personnel, and properties of said bureau.

II.

All unexpended funds of appropriations heretofore made for the Signal Corps of the Army and already specifically allotted for use in connection with the functions of the signal service as defined and limited by sub-paragraph (1) of paragraph 1 hereof, shall be and remain under the jurisdiction of the Chief Signal Officer; all such funds already specifically allotted for use in connection with the functions of the Aviation Section of the Signal Corps as defined and limited by sub-paragraph (2) of paragraph 1 hereof are hereby transferred to, and placed under the jurisdiction of, the Director of Military Aeronautics for the purpose of meeting the obligations and expenditures authorized by said section; all such funds already specifically allotted for use in connection with the functions hereby bestowed upon the Bureau of Aircraft Production, as defined and limited by sub-paragraph (3) of paragraph 1 hereof, are hereby transferred to, and placed under the jurisdiction of, said Director of Aircraft Production for the purpose of meeting the obligations and expenditures authorized by said bureau in carrying out the duties and functions hereby transferred to, and bestowed upon, said bureau; and in so far as such funds have not been already specifically allotted to the different fields of activity of the Signal Corps as heretofore existing, they shall now be allotted by the Secretary of War in such proportion as shall to him seem best intended to meet the requirements of the respective fields of former activity of the Signal Corps and the intention of Congress when making said appropriations; and the funds so allotted by the Secretary of War to meet expenditures in the field of activity of the Aviation Section of the Signal Corps are hereby transferred to, and placed under the jurisdiction of, the Director of Military Aeronautics for the purpose of meeting the obligations and expenditures authorized by said section; and the funds so allotted by the Secretary of War to meet the expenditures in that part of the field of activity of the Signal Corps, which included the functions hereby transferred to the Bureau of Aircraft Production, are hereby transferred to, and placed under the jurisdiction of, the Director of Aircraft Production for the purpose of meeting the obligations and expenditures authorized by said bureau.

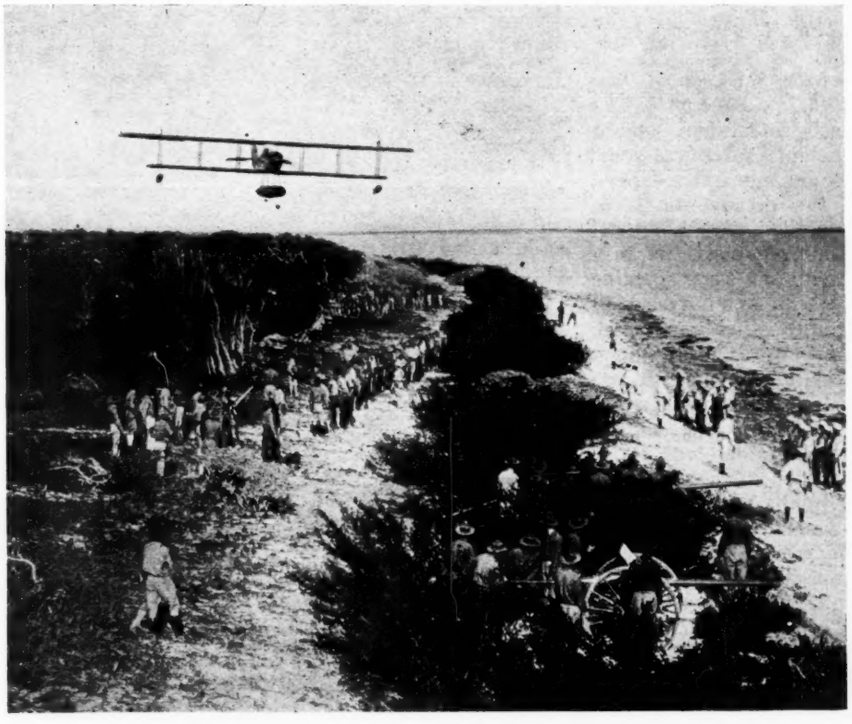
III.

This order shall be and remain in full force and effect during the continuance of the present war and for six months after the termination thereof by the proclamation of the treaty of peace, or until theretofore amended, modified or rescinded.

WOODROW WILSON,
President of the United States.

The White House,
May 20, 1918.

Training American Naval Aviators



This picture was made recently at one of the training stations of the Aviation Section of the Navy, and shows a type of Navy training seaplane in the hands of a student aviator.

Packard Gives Women Complete Mechanical Training

Thoroughly Equipped School Accommodates 240 Pupils at a Time —Cost of Instruction $40 Per Person

IT is expected that an army of 5000 khaki-uniformed women will be working in the factory of the Packard Motor Car Co. before the next twelve months pass. The company is finding female labor so satisfactory that it has gone to the pains and expense of fitting up a complete school for the purpose of preparing women for industrial work.

Be it understood, however, that it is not the intention to supplant the men with women.

Five hundred and sixty persons, or approximately 5 per cent of the factory working force, are women. They can be found in nearly all departments. Of course they are more numerous in the departments relating to sewing and the working of fabrics because of their particular adaptability to this work; but they are rapidly making débuts in other departments heretofore dominated by men, and they are proving themselves capable workers.

The introduction of female labor in the Packard plant is not new. It has employed women in various departments for the past five years, but not in large numbers. Only since the shortage of male help began to be acute did the problem take on a serious aspect. The employment of women is now on a large scale.

Before the school was started, women were trained in the shop under a competent foreman, and many became quite expert. But the disadvantages of this method were many. It not only reduced the productivity of the machine while thus engaged in training a new operator; not only did it waste much material, but the process was costly. And when the woman finally did reach the stage where she was ready to enter on the regular production she knew only that for which she was trained —she was only a mechanical operator of one kind of machine. She was ignorant of everything outside the task for which she was prepared. She lacked the fundamentals.

Above—A view of the school. The girls are here shown at their first lesson. Note the set of pins they are in the act of measuring. Below—For their elementary training the students work at three long tables. In the distance are shown the machines on which the women are later trained

The foregoing statement, however, must not be misconstrued to mean that the plan is not a good one, but is mentioned to establish the fact that where such a method is pursued it has its limitations. A company cannot afford, especially these days, to leave many machines idle for training new help. Nor can it suffer the loss of a high-class production man's time while he is giving instruction. These are days of conservation.

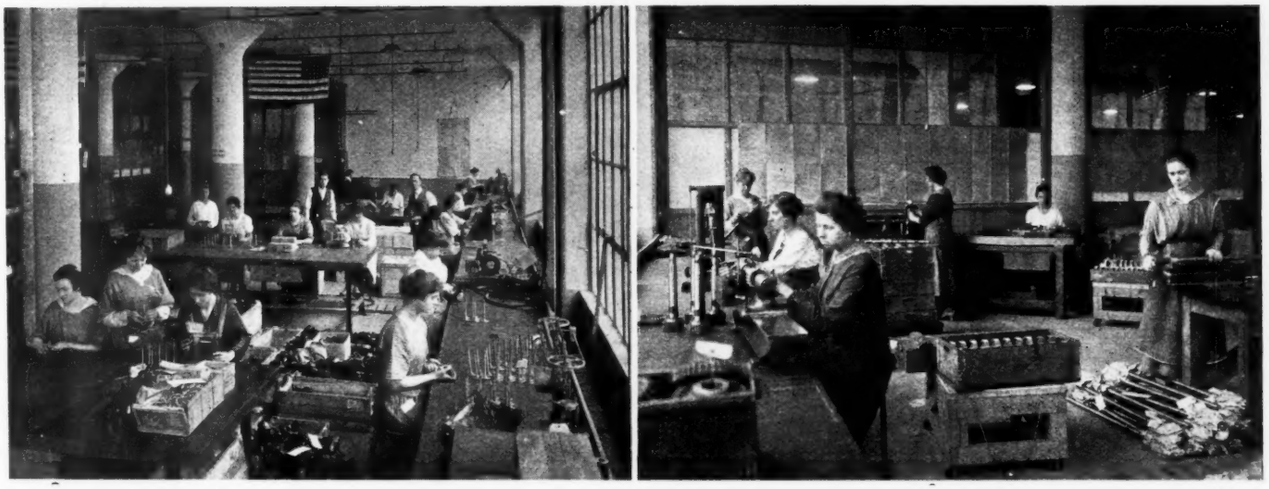
As opposed to the foregoing process is the training school, or vestibule school, as some term it, where help can be adequately trained before it enters the factory on regular production. Of the two methods, the vestibule system is preferable, as it is less costly and is more complete. Packard estimates that the cost of preparing a woman for work by the shop method is $120 and the cost of training her in the school $40. The latter preparation and training are more valuable.

Women not being of a mechanical mind need extensive instruction along this line before they can be expected to gain a comprehensive idea of what they are doing. To satisfactorily attain this knowledge, they must be started in the groundwork. They must acquire the basic facts.

One hundred and forty women are under instruction at the present time, and it is expected this number will be increased to 200. The instruction room is large enough and has facilities sufficient to take care of 240. The school has been run only one month; two weeks ago only twenty girls were registered. During the week ended May 11 eighty women were prepared for the factory.

Women starting in the school are first familiarized with measuring and reading blueprints. The elementary course is divided into eight periods:

	Hr.
1—To read a scale. Measuring pins and block with scale.	3
2—Measuring holes in steel plate	2



Two views of the light, airy rooms where women are employed on various kinds of inspection work at the Packard plant

	Hr.
3—Using male thread gages in test plate	2
4—Using female thread gages for measuring studs	2
5—Measuring pins with snap gages	3
6—Measuring pins with micrometers	4
7—Measuring bevel gears with protractors	2
8—Measuring test shaft with gages used on all previous inspection prints, also marking sizes and notes on blank print	4
Total time, hours	22

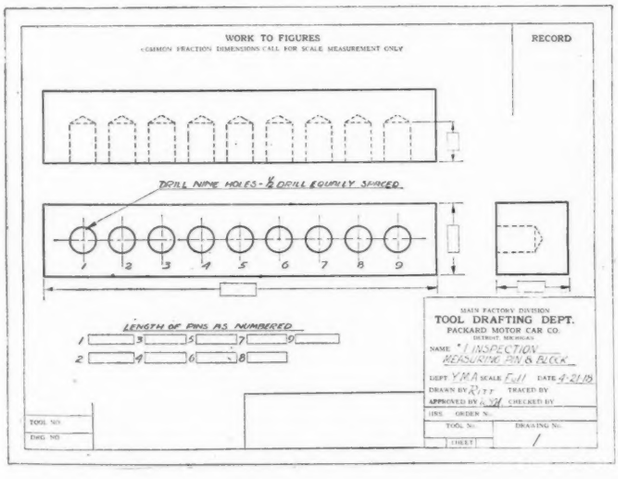
In the first period the women are given a steel block in which are set nine steel pins of various lengths and diameters. These they are asked to measure and indicate sizes on the blueprint furnished with the block. Three hours are given for this lesson.

The next period they are given another steel plate through which ten holes of different diameters are bored. With calipers the students measure the various diameters and mark their findings on the second blueprint.

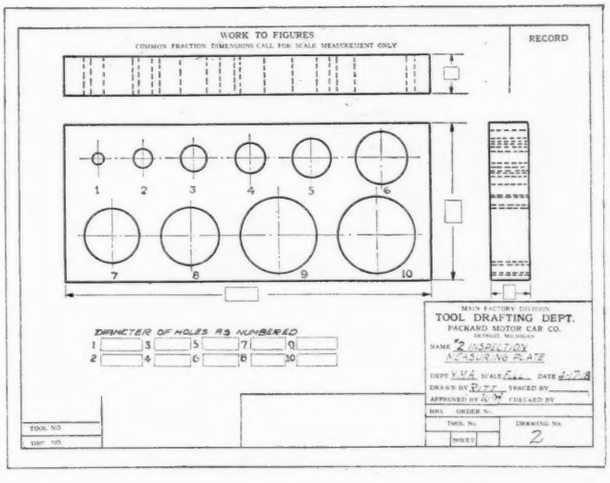
As noted in the tabulation, each lesson is allotted a certain time, based on the amount of time it requires an average student to complete each point, and is not used for the purpose of compelling students to work within these limits. If anyone cannot successfully familiarize herself with the operation within the allotted time she is permitted to use as much time as necessary.

Step by step the student is introduced to new instruments. In the third lesson the use of the male thread gage is begun. The fourth lesson takes up the female thread gage. The fifth considers the snap gage. The sixth is on micrometers. The seventh is on protractors. When she reaches the eighth lesson she is familiar with the use of all the measuring tools. At this point she is given a blueprint with a test shaft incorporating all the various forms of measurement she will be likely to encounter in the shop—diameters, radius recesses, bevels, tapers, internal and external threads, counterbores and ground surfaces.

Equipped with this knowledge, the women are ready to make a choice of the branch in which they would like to work—inspection, welding, assembly, bench work, machining, tool crib or stockroom, each of these being represented in the school. After selecting a line of work,


WORK TO FIGURES
COMMON FRACTION DIMENSIONS CALL FOR SCALE MEASUREMENT ONLY
RECORD
DRILL NINE HOLES-½ DRILL EQUALLY SPACED
1 2 3 4 5 6 7 8 9
LENGTH OF PINS AS NUMBERED
1 3 5 7 9
2 4 6 8
MAIN FACTORY DIVISION
TOOL DRAFTING DEPT.
PACKARD MOTOR CAR CO.
DETROIT MICHIGAN
NAME "1 INSPECTION MEASURING PIN & BLOCK
DEPT. Y.M.A. SCALE F.11 DATE 4-21-18
DRAWN BY R.T.T. TRACED BY
APPROVED BY C.W. CHECKED BY
JOB NO. ORDER NO.
TOOL NO. DRAWING NO. 1
SHEET
TOOL NO.
DWG. NO.

Blueprint given the students for the first lesson. In spaces provided, they indicate the lengths and diameters of pins in a steel block supplied them at the time


WORK TO FIGURES
COMMON FRACTION DIMENSIONS CALL FOR SCALE MEASUREMENT ONLY
RECORD
1 2 3 4 5 6
7 8 9 10
DIAMETER OF HOLES AS NUMBERED
1 3 5 7 9
2 4 6 8 10
MAIN FACTORY DIVISION
TOOL DRAFTING DEPT.
PACKARD MOTOR CAR CO.
DETROIT MICHIGAN
NAME "2 INSPECTION MEASURING PLATE
DEPT. Y.M.A. SCALE F.11 DATE 4-21-18
DRAWN BY R.T.T. TRACED BY
APPROVED BY C.W. CHECKED BY
JOB NO. ORDER NO.
TOOL NO. DRAWING NO. 2
SHEET
TOOL NO.
DWG. NO.

Blueprint furnished with the second lesson which the students use for acquainting themselves with the use of calipers. Five more blueprints follow

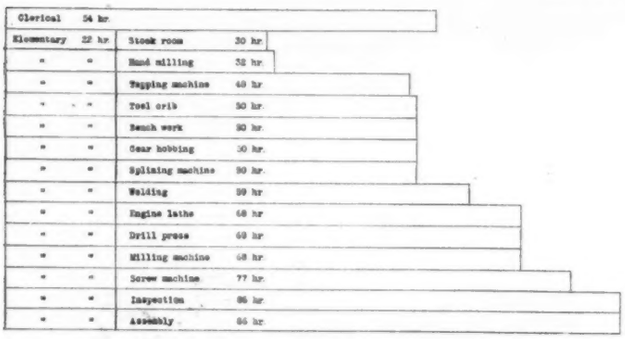
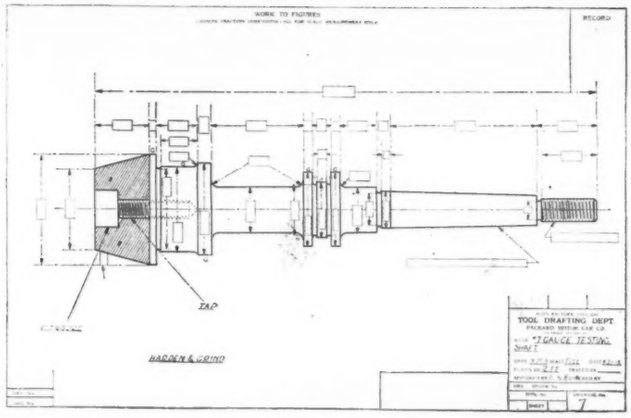


Chart showing divisions of courses

they enter the practical study of it. Because of the greater physical requirements of some of the work, those who, in the opinion of the instructors, are not physically strong enough to endure the more arduous tasks are encouraged to follow the lighter work, such as inspection or bench work.

From the long tables on which they work during their preliminary steps they pass for their practical work into another part of the room equipped with thirty machines and the necessary tools. Here most of the training is on actual production. Parts to be inspected are sent from the factory to the school for this purpose, and the women work on these as they would in the shop.

In the other departments, such as milling work, lathe work, etc., only such jobs are chosen as are good samples of their respective lines. In each case an opportunity is given within the period allotted to work on at least three different kinds of parts. For instance, in the screw machine department a student, in the 6 days allotted here, can work on truck parts, passenger car parts and air-

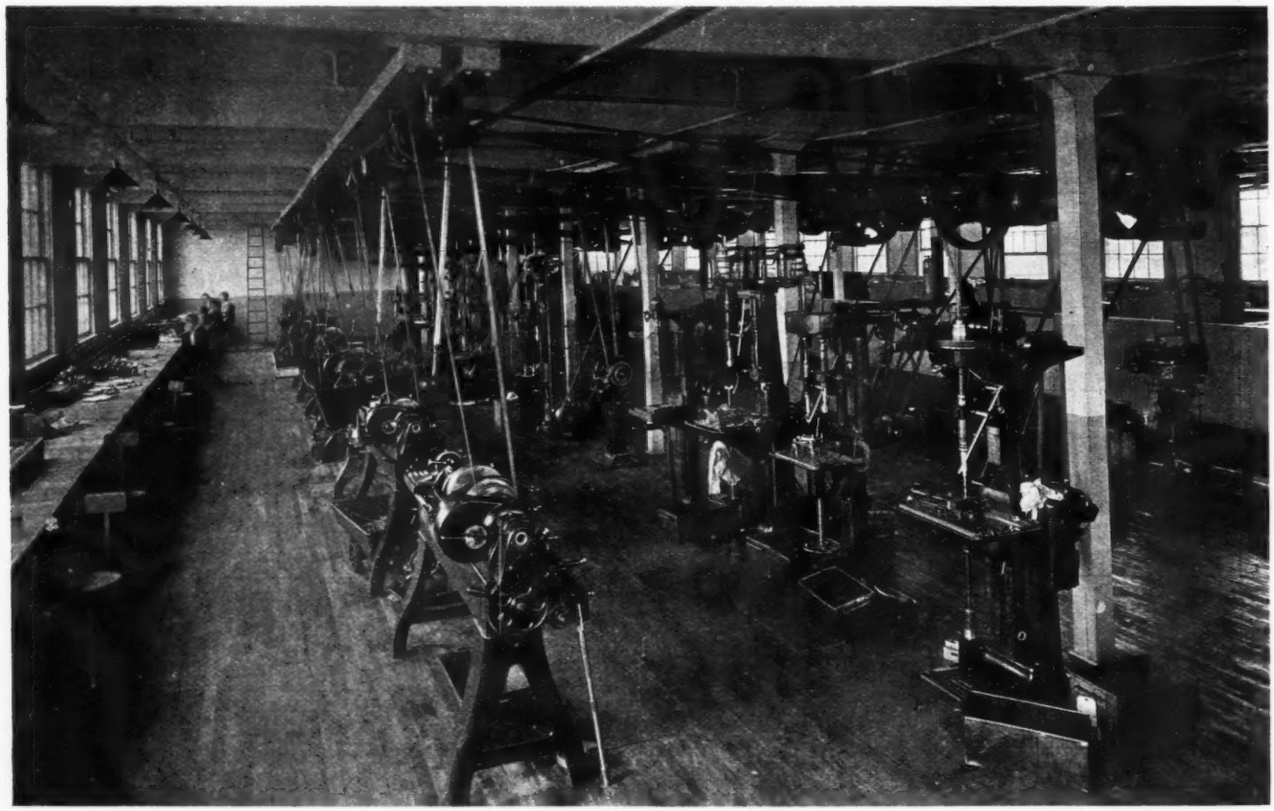


The last blueprint. This is a general review of the foregoing. The steel shaft accompanying this blueprint permits them to employ all the different forms of measurement they are likely to encounter in the shop—diameters, radius recesses, bevels, tapers, internal and external threads, counterbores and ground surfaces

craft parts, each operation consuming two days. In other words, the number of parts a woman should be able to turn out in the allotted time is more than enough to tally with a day's production of the factory. Therefore, instead of maintaining the production of this one part for the entire period, thereby producing an over-supply, she is given an opportunity to familiarize herself with a number of different parts. One instructor is provided for five students.

After three days' attendance, and it is assured the women will stay at the work, they are given a khaki uni-

(*Continued on page* 1025)



These are machine tools of various kinds used in actual production work in the Packard plant and set up here in the school for the instruction of women workers

The Albatross Fighting Biplane

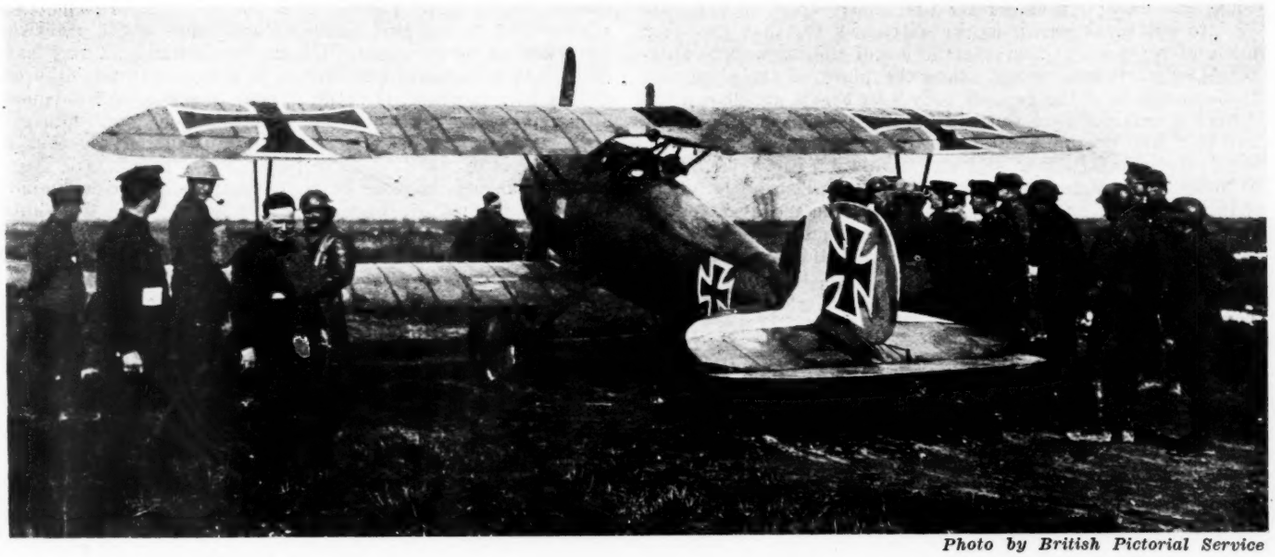


Photo by British Pictorial Service

DURING the past year we published in AUTOMOTIVE INDUSTRIES very detailed descriptions of the principal German aircraft engines, including the Maybach and two sizes of Mercedes and Benz each. These descriptions were obtained and the drawings made from airplanes brought down by the British air forces. Similarly complete technical descriptions of the structural part of airplanes have rarely been published, but recently there has appeared in *Flight* of London an exceptionally detailed description of the Albatross fighting biplane, one of the best known German fighting machines, of a make which already had made a name for itself previous to the war. Following a suggestion of our contemporary, we herewith reproduce the article almost in full, though we have redrawn many of the line illustrations and "adapted" the text somewhat.

The Albatross biplane belongs to the C class; that is to say, it is a general utility machine used for artillery observation, reconnaissance work, photography and fighting. Incidentally the machine appears to be also used for bombing—in a small way only—as it is equipped with a bomb rack holding four bombs.

Aerodynamically the Albatross is chiefly interesting on account of the evident attempt on the part of the designer to provide as good a stream-line body as is possible having regard to such external fitments as machine guns, etc., which naturally detract to a certain extent from the efficiency of the lines of a body of a modern two-seater, where the gunner frequently has to stand up, with the upper portion of his body projecting above the fuselage covering. This effort at stream-lining is particularly noticeable in the nose of the machine, where the aluminum cowling over the engine is carried right across, leaving only the exhaust collector exposed. In front of the covering of the body proper is a cowl shaped as a truncated cone, which serves to enclose the nose and reduction gear of the engine, and to carry the lines of the body into those of the "spinner" around the boss of the propeller. The sides of the body, from a short distance behind this cowl to the tail, are flat, as is also the bottom, but the top of the fuselage is covered with a curved covering of three-ply.

At the rear the fuselage terminates in a horizontal knife edge, an easy flow being provided for the air by running the top covering of the fuselage into the three-ply covering of the fin in a smooth curve. Similarly, the fixed tail plane, which is of a symmetrical section and very deep, has its top surface practically in continuation of the top covering of the body, presenting no great and abrupt changes in curvature. The total effect is one of extremely smooth and easy flowing curves, and the body resistance cannot be very great in proportion to the cross sectional area of the body.

As regards the rest of the machine, the Albatross designer does not appear to have made the same effort to cut down resistance. For instance, the wings have the usual circular section stranded cables for taking lift and landing stresses.

Constructionally the Albatross shows much that is of interest, chiefly in the construction of the body, but also in other respects. Fundamentally the Albatross body construction is that employed in building light boats and hydroplanes. There is a light framework, consisting of four main rails at the corners of the rectangular section body, two auxiliary rails about half way up on the sides, and bulkheads or transverse partitions of varying shape and thickness along the body at intervals. The whole is then, as in boat building, covered with a skin of ply-wood, in this case three-ply. Regarded as a compromise, this form of body construction would appear to be quite good. Without entailing the time and expense of the true monocoque body, it provides a reasonably good stream-line form. As a manufacturing proposition it is probably about equal to the girder type of fuselage, while it has the advantage of not requiring any truing up in the erecting process, accuracy being automatically assured when the parts are made by means of jigs and formers. One advantage this form of body does appear to possess, although to a somewhat lesser extent than the true monocoque—shell splinters and rifle and machine gun bullets are less likely to damage it seriously than the girder type. In the latter, should a longeron be shot through, nearly all the structure would be gone, whereas this semi-monocoque structure would retain its strength even after damaging some of the longitudinal members.

No information is at hand regarding the question of strength in relation to weight in this model, but in the spring of 1914 an Albatross biplane was taken over to England and flown there by Thelem which had a body fundamentally similar to the one under discussion, though differing from it in details.

At the time some particulars of tests carried out on an Albatross fuselage of this type by the German Institute of Aeronautical Research were published, according to which the factor of safety of the Albatross body was about 60, and the resistance to bending 2.5 times greater than that of a diagonally wired fuselage of the same outside dimensions and

having numerous members of the size usually employed in structures of this type. The Institute also stated that the Albatross firm was justified in concluding that the bending resistance of the veneer type of body is greater than that of a cross wired fuselage of the same weight, although no figures were given.

When examining the detail construction of the Albatross body, the most impressive feature, apart from the absence of internal truss wires, is the extensive use that has been made of ply-wood in the construction of the transverse bulkheads or partitions, which takes the place of the strut and truss members of the type of body. In Fig. 1 are shown the different bulkheads of the body, with dimensions, etc. The rail half way up the sides of the body is placed parallel with the propeller shaft, thus serving as a datum line from which to make measurements of distances and angles.

In Fig. 1 are shown half sections of the more important and representative bulkheads. In the front portion of the body, the bulkheads, which have to take the weight of the engine, are about 1¼ in. thick and are made up of a number of laminations of wood, which are, of course, so placed in relation to one another that the grains of adjacent layers run at angles to one another. It was further noticed that in making up these bulkheads whole sheets of the different woods were not always employed. On the contrary, many of the layers appeared to have been spliced, being made up of comparatively small pieces. It is possible that this was done with a view to utilizing pieces of wood that would otherwise have had to be scrapped. On the other hand, it may have been done to increase the amount of crossing of the different grains. In any case, it would appear to serve both purposes, although one would expect the time taken in manufacture to be somewhat increased by such careful fitting together of small pieces of wood.

Fig. 2 shows the nose of the Albatross, and clearly indicates the method of supporting the engine. The first bulkhead, it will be seen, is solid, and is at right angles to the propeller shaft. The second bulkhead—2, Fig. 1—is light-

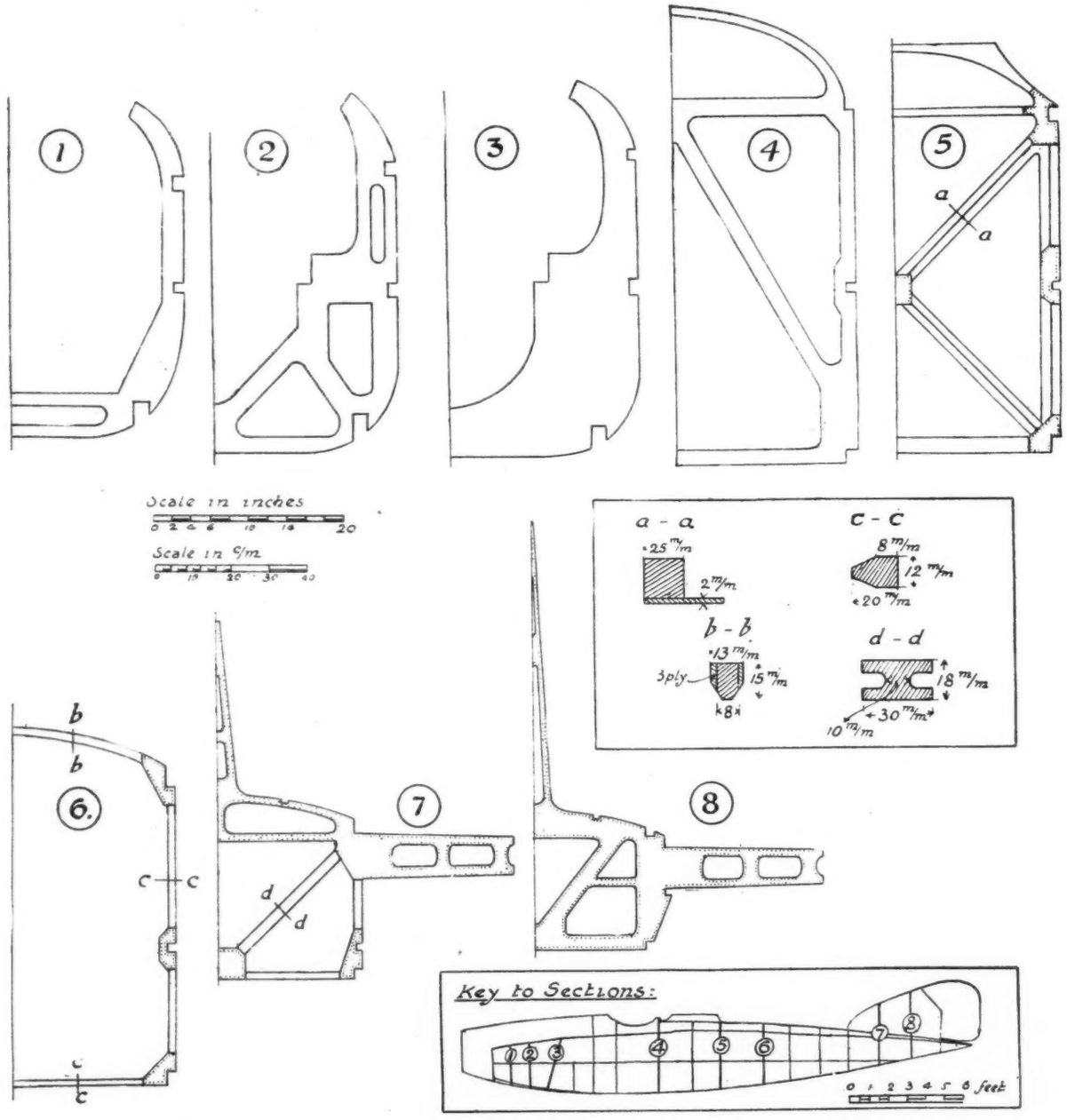


Fig. 1—Half sections of some of the more important bulkheads of the Albatross fighting biplane. Inset—Dimensions of some of the members

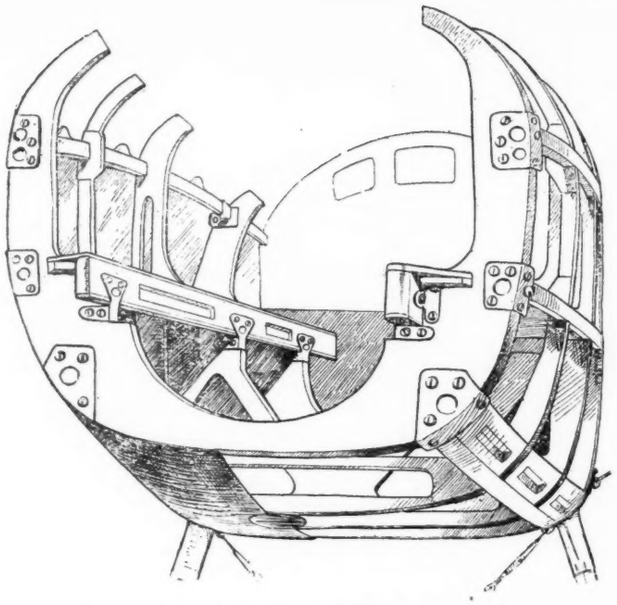


Fig. 2—Sketch showing engine bearers of the Albatross biplane

ened by piercing as shown, and is also vertical, while the engine support is formed by a solid bulkhead—3, Fig. 1—which slopes back so as to support the front chassis strut and front cabane strut at its lower and upper ends respectively. As the front engine support is clearly shown in the sketch, Fig. 2, it has not been included in Fig. 1.

The bulkhead numbered 1 in Fig. 1 is merely a former, and does not help to support the engine bearers. These are of I section spruce, and have ply-wood flanges top and bottom as shown in Fig. 3. The upper flange is continued outward to the middle longeron so as to form a shelf or bracket at the sides of the engine.

A construction somewhat different from that of the engine supports is employed in the panel between the pilot's and gunner's cockpits. This consists (4, Fig. 1) of a spruce framework faced each side with 3 mm. three-ply, the whole having a thickness of 26 mm. (about 1 in.). Behind the gunner's cockpit is a light partition built up as shown in 5, Fig. 1. Two light spruce struts run diagonally across from corner to corner of the body, crossing in the center of the fuselage, at which point they are reinforced by three-ply facings and triangular blocks glued into the corners.

Their attachment to the upper and lower body longerons is of a similar construction, and will be clear from the diagram. On their front faces these diagonal struts are provided with a 2 mm. flange to stiffen them against buckling. A canvas curtain is secured to the front of this partition, having in it pockets for maps, etc.

From this point back to the point where the tail plane and vertical fin are attached, the formers of the body are in the nature of a very light framework of thin struts, a typical one being shown at 6, Fig. 1.

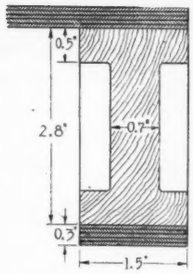


Fig. 3—Section of engine bearers of Albatross biplane

One of the features in which the present Albatross differs from previous types is the construction and attachment of the tail plane and vertical fin. The latter is covered with three-ply, and is made integral with the body, out of which it grows, so to speak. The construction is shown at 7 and 8, Fig. 1, and in the perspective sketch, Fig. 4. The tail skid is supported on one and sprung from the other of these two bulkheads. The tail plane is provided with hollow spars which fit over cantilever beams integral with bulkheads, 7 and 8, Fig. 1.

(To be continued)

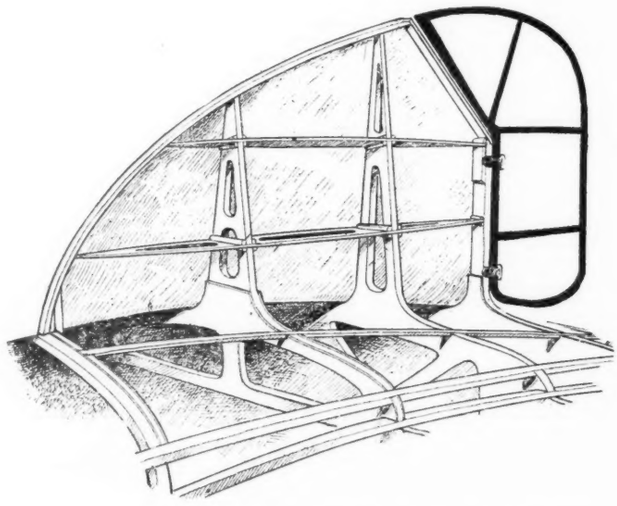
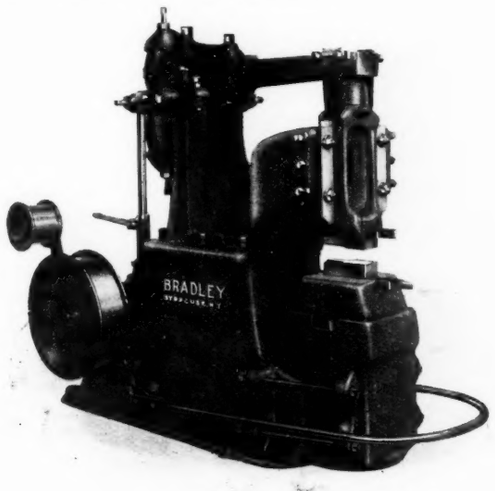


Fig. 4—Construction of the vertical fin on the Albatross biplane

Bradley Hammer for Forging Balls

A HAMMER for forging steel balls to their finished size is being manufactured by C. C. Bradley & Son, Inc., Syracuse, N. Y. In automobile practice spherical surfaces are used to quite an extent, in steering connections, engine supports, etc. It was formerly the practice to finish a drop forging of spherical shape by either turning or grinding it. The Bradley company has developed its hammers to such a state that the same results can be obtained without machining, in two operations.

In both the roughing and the finishing operation, two split dies of two steps each are used. For a 2 in. ball about ⅛ in. stock is allowed to be removed. In the first operation the forging is reduced to within 0.025 in. of the finished size, and 220 2-in. balls can be turned out in a working day of 9 hr., the operators heating the balls themselves. In the second or finishing operation, which reduces the ball diameter 0.025 in., the operator turns out 350 balls in 9 hr. While the hammer is operating, the piece is constantly rotated by the operator. No trouble is experienced in holding these balls within 0.005 in. The economy resulting from the elimination of machine work is readily apparent.



Bradley hammer

Nomography—II*

With Special Reference to Its Use in Engine Design

By F. Leigh Martineau, Assisted by A. Marshall Arter

THE force due to acceleration is found from the formula

$$F = W.a/g \quad \ldots \quad \ldots \quad \ldots \quad (15)$$

or, in logarithmic form,

$$\log. F + \log. g - \log. W - \log. a = 0 \quad \ldots \quad (16)$$

Again Type A and the plotting becomes as shown in Fig. 10.

The formula for kinetic energy is

$$K E = W.v^2/2\,g \quad \ldots \quad \ldots \quad (17)$$

or

$$\log. K E + \log. 2 + \log. g - \log. W - 2 \log. v = 0 \quad (18)$$

This as plotted becomes as in Fig. 11.

The formula for centrifugal force is

$$C F = 0.000343\, W r N^2 \quad \ldots \quad \ldots \quad (19)$$

In this case there are four variables, and the procedure is in consequence slightly different.

Taking logarithms, this can be divided up into two parts, the first being

$$\log. W + \log. r - \log. X = 0 \quad \ldots \quad \ldots \quad (20)$$

This is, of course, a Type A nomogram, giving the values of X for any values of W and r. (See Fig. 12.)

The ungraduated line, called the reference line in the diagram, is the line giving the result of this formula.

The point on this line so obtained is then used as one variable in a second part expressed by the formula

$$\log. C F - \log. 0.000343 - \log. X - 2 \log. N = 0 \quad (21)$$

and from this is obtained the centrifugal force produced at any speed of revolution by drawing a second line from the speed scale across the point on the reference line already found to the centrifugal force line.

Conversely, if, for example, in a governor design it is desired to find the weight and radius to produce a known centrifugal force at a predetermined speed, by joining the points representing the force and speed a point is obtained on the reference line. Any straight line through this line will cross the weight and radius lines at suitable values.

In this way a choice can be made to suit the circumstances of the design with facility and without calculation, as the line can be rotated about the point on the reference line until it crosses the other two at suitable values.

In engine design particularly there are many complicated calculations for which it is extremely useful to have a simple manner of getting out accurate results, as much for the comparison of different arrangements and dimensions to produce the same result as for determining the exact proportions.

One such calculation is that dealing with compression ratio and pressure. (See Fig. 13 for formula.)

In this case there are really five variables to be dealt with, but two of these can be considered as a ratio, and in this way a nomogram can be arranged with only four variables.

In this calculation there is V_1 the volume of the compression space and V_2 the volume swept by the piston plus the volume V_1.

This can be reduced to one variable as V_2/V_1 or R, the ratio.

Now this ratio to a certain power equals the compression pressure absolute divided by the initial pressure absolute.

The index required for the power of the ratio varies with certain engine conditions, but its generally accepted value is 1.29.

The nomogram Fig. 13 has been got out to solve this problem, and in it the line representing the index is graduated from 1.2 to 1.4, the point 1.29 being specially marked.

When the value of this index has been definitely established for any type of engine all other engines of the same type can have the ratio accurately determined by this diagram, use being made of the index so found.

The compression pressure also varies with the initial pressure in the cylinder, and a line is included on the diagram for this also; this line is graduated as low as 10 lb. per sq. in. absolute, which is equivalent to the average absolute pressure at a height of 11,500 ft. (3500 metres).

This scale is also carried beyond the normal average atmospheric pressure to allow of the diagram being of use when dealing with the design of engines using "stuffing."

*Paper presented to the Institution of Automobile Engineers of Great Britain.

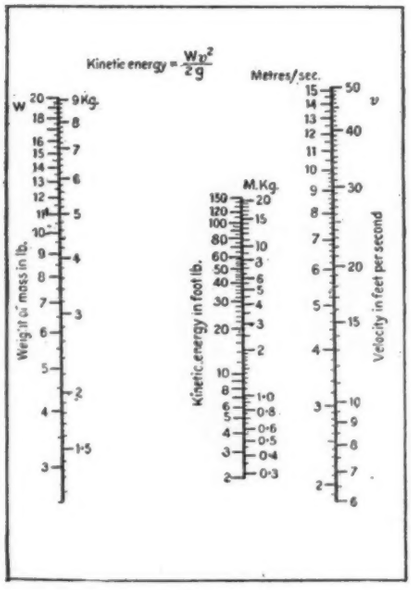


Fig. 11

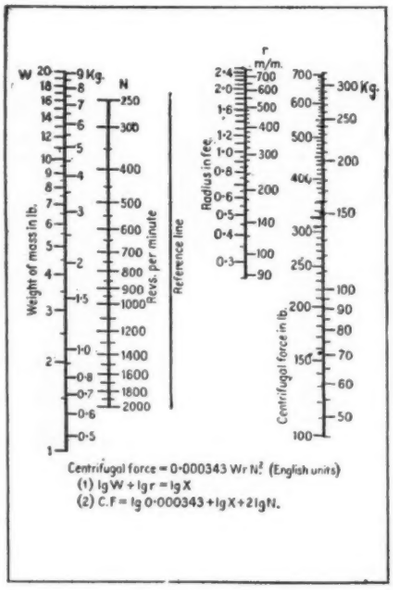

W
Weight of mass in lb.
N
Revs. per minute
Reference line
r
m/m.
Radius in feet
Centrifugal force in lb.
Centrifugal force = 0·000343 Wr N² (English units)
(1) lg W + lg r = lg X
(2) C.F = lg 0·000343 + lg X + 2 lg N.

Fig. 12

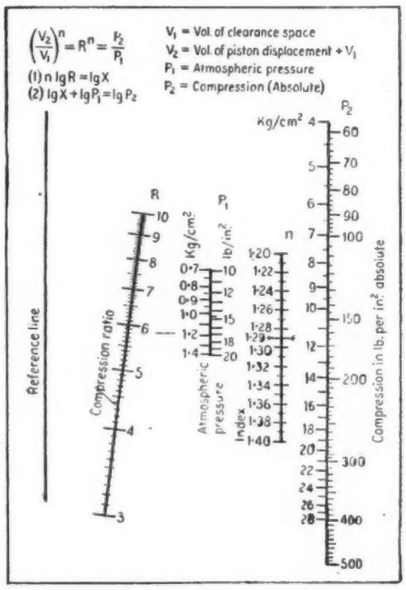

(V₂/V₁)ⁿ = Rⁿ = P₂/P₁
(1) n lg R = lg X
(2) lg X + lg P₁ = lg P₂
V₁ = Vol. of clearance space
V₂ = Vol. of piston displacement + V₁
P₁ = Atmospheric pressure
P₂ = Compression (Absolute)
Reference line
Compression ratio
Atmospheric pressure
Index
Compression in lb. per in² absolute

Fig. 13

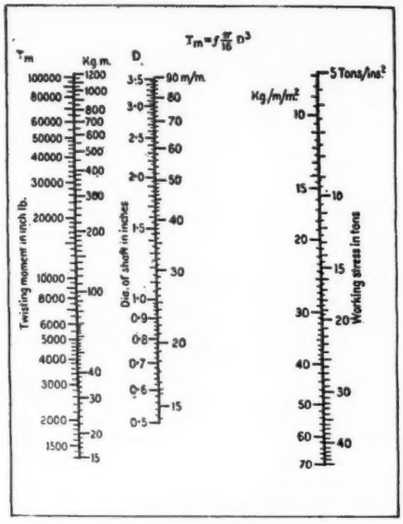


Fig. 14

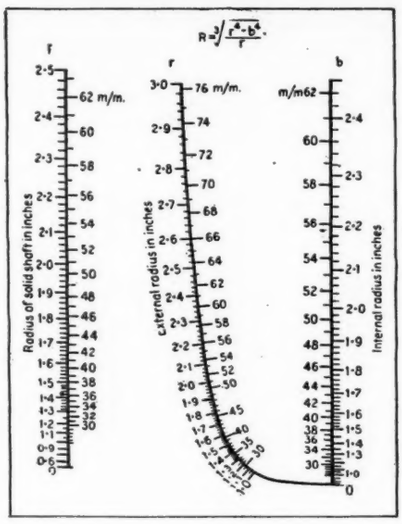


Fig. 15

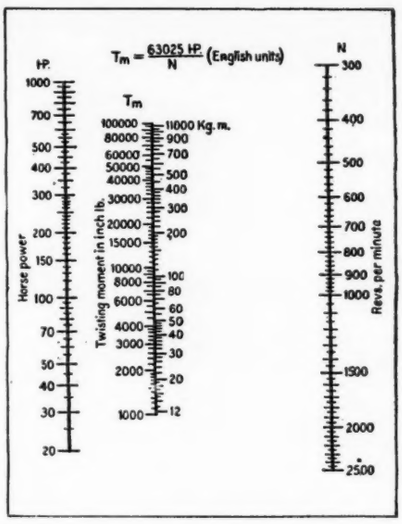


Fig. 16

The diagram is employed as follows:

Having fixed on the compression desired, the probable index, 1.29 if this has not otherwise been determined, and the initial pressure in the cylinder, about 14 lb. per sq. in. normally, draw a straight line from the desired compression pressure through the initial pressure to cut the line marked "reference line." From the point so found draw a second line to the index; this line will cross the ratio line at the correct value.

This, being a four variable nomogram, is divided into two parts, each of three variables.

The one is

$$n \log. R - \log. X = o \quad \ldots \quad \ldots \quad (22)$$

This is a Type B nomogram, and the second is

$$\log. X + \log. P_1 - \log. P_2 = o \ldots \quad \ldots \quad (23)$$

or a Type A nomogram. Both types of diagram are therefore combined in this example.

In dealing with the problems of shaft design it is extremely useful to be able to make a direct comparison of the safe twisting moment of different shafts in which there may be variations both in diameter and materials. The nomogram Fig. 14 gives the data necessary for such a comparison for solid shafts.

This formula, expressed in logarithms, becomes

$$\log. T_m - \log. f - \log. \pi + \log. 16 - 3 \log. D = o \ldots (24)$$

The diagram has been plotted to deal with shafts from ½ to 3 in. in diameter with working stresses of 5 to 40 tons (11,000 lb. to 90,000 lb.) per sq. in., and is graduated for metric units as well as British units, so that comparisons can be made with either system.

As hollow shafts largely replace solid shafts in modern engines, it is convenient to be able to compare these also; the nomogram Fig. 15 has been prepared with this end in view.

The formula in this case becomes

$$R^2 + b^4/r - r^3 = o \quad \ldots \quad \ldots \quad (25)$$

This is a Type C nomogram.

With these two diagrams (Figs. 14 and 15) it is possible to make a comparison, with accuracy and extreme rapidity, of shafts in torsion of all the sizes included in them, both hollow and solid.

The average twisting moment on a shaft can be found from the formula:

$$T_m = 63{,}025 \text{ hp.} / N \quad \ldots \quad \ldots \quad (26)$$

This can be written

$$\log. T_m + \log. N - \log. 63{,}025 - \log. \text{hp.} = o \ldots (27)$$

and forms a Type A nomogram as in Fig. 16, which is helpful as an addition to the two preceding Figs. 14 and 15.

In dealing with the question of helical springs, some very ingenious but complicated diagrams have been got out and published at various times. The nomogram is again exceedingly helpful in facilitating, by simplifying, the necessary calculations.

The diagrams given here relate to springs designed with a stress of 35,000 lb. per sq. in. By slight modification of the diagram similar results can be obtained for any other stress desired. Generally such a stress as is here used is quite in accordance with practice for the small sizes of wire, but it should not be used for sizes larger than those given.

(*To be continued*)

—

Tungsten Sulphide Ore

ALTHOUGH the chemist knows two tungsten sulphides, WS and WS_2, corresponding in their compositions to the oxides, no natural tungsten sulphides were known until last year, when a very complex tungsten ore, apparently the sulphide WS, was discovered in the Emma mine, situated in the Little Cottonwood district, 25 miles southeast of Salt Lake City, Utah. The mine used to be rich in lead-silver ores, but had hardly been worked for forty years. The mineral in question resembled graphite in appearance, forming lead-gray leathery flakes, opaque, of metallic luster, sufficiently soft to mark paper, but very heavy, the density of the pure substance being probably 7·4. B. C. Wells and B. S. Butler of the United States Geological Survey, who described the occurrence in the *Journal of the Washington Academy of Science*, experienced great difficulty in the analyses on account of the complex character of the ore. The specimens contained about 45 per cent of tungsten, 29 per cent of sulphur, 9 per cent of iron and 4 per cent of lead, together with 1 per cent or less each of arsenic, antimony, zinc, manganese, copper, silver, nickel, etc. Assuming the tungsten to be present as WS_2, the ore contained 61.5 per cent of this sulphide, which would be analogous to molybdenite MoS_2. The tungsten sulphide is not attacked by hydrochloric and nitric acid, but is decomposed by aqua regia; it is not oxidized by roasting in air, but burns in oxygen.

—

RECEIPTS of zinc and spelter at the principal markets for the calendar year to April 13 have been 1,465,000 slabs, compared with 2,860,000 slabs for the same period last year, and shipments have been 2,661,000 slabs, compared with 1,560,000 slabs a year ago. This is fair evidence of a continued and growing activity in the zinc market.

—

IN England a great deal of attention is being paid at the present time to the proposition of co-operative research, especially in connection with airplane problems. Rapid progress in construction is essential and overlapping of effort must be avoided as much as possible.

Automobile Industry a Source of Mechanical Skill

Many Mechanics Trained in Factories and Garages—Good Roads Movement Set Agoing by Industry—A National Asset of Vast Importance in War

By A. P. Brush

THE automobile industry is the world's best training school for the different kinds of mechanical skill, without which the enemy can not be successfully frustrated in his war activities; therefore, from the standpoint of the problematical duration of the war, it is important that mechanics not directly necessary on war work be kept profitably employed in this industry, and that additional mechanics be trained by it to the end that the future national supply of mechanics shall be trained in the largest possible numbers.

This applies not only to the mechanics used and trained in the construction of the product, but also the training which the product gives to others in its care and operation.

During the three or four decades immediately preceding the war, the expression, "a mechanical civilization," was common and relatively justified, but if the world is to recover from war wastage in anything like the minimum lapse of time, the age of the mechanic will really begin when the war ends, and anything that can be done during the war to increase general mechanical skill without jeopardizing the final result is beyond question a matter of the utmost importance to humanity.

Saved Country from Disaster

It has been truly remarked that the automobile and the progress in road making, which it alone has stimulated, saved this country from a transportation disaster during the winter of 1917-18. It is equally true that a continuation of the national interest in good roads, which is in itself a phase of the automobile industry, will be necessary to prevent future national calamity. Automobiles, good roads and mechanically trained citizens are fundamental essentials in shortening the period of reconstruction after this war.

Common prudence demands consideration of the possibility of an end of the war other than that which we hope for, pray for and fight for. In the event of such a world disaster, how immeasurably important to this country would be its roads, its motor cars, its mechanics, its motor car drivers and its mechanical industries going at top speed.

For whatever time may be necessary, this nation can afford to get along without its intoxicants, with less moving picture entertainment, with less tobacco, with simpler and less expensive clothing and even with less acceptable feeding, but it can not afford to get along with less than the maximum possible transportation facilities, including improved highways and motor vehicles of all types.

We can not afford to get along with anything less than the maximum percentage of mechanically trained citizens and the industrial equipment and organization, without which the mechanical specialists can not be trained and without which such training can have no useful expression.

No industry equals the motor car industry in teaching the average citizen the futility of attempting any worthwhile accomplishment without specialization in training and with co-ordination of effort which can only be secured through the direction of industrial activities by competent executives.

No other industry outside of those essential to sheer human existence is as wholesome and beneficial in its effect upon its patrons.

The so-called pleasure vehicle gives to its user mechanical skill, the habit of logical and intelligent thinking, a wider range of human intercourse, the habit of outdoor living and an appreciation of the improved highway as an instrument for transportation.

Would Have Helped Russia

Had Russia had an automobile industry in the sense that this country has, there would have been no lapse into a helpless state of anarchy, because a larger proportion of her citizens would have had the habit of obedience to executive direction in their industrial activities. The directing executives from the shop foreman up would have been Russian, not German. Such a Russian industry would have taught Russia, as it has helped to teach America, that accomplishment always depends upon that co-operation and co-ordination of effort which can be achieved only through willing industrial obedience to wise executive direction.

By wise executive direction I mean a direction by executives from the shop foreman up who realize that their right to direct depends upon their ability to direct in ways that serve the national welfare.

Wise, competent and loyal directing executives, from the lowest to the highest grades, plus obedience to their direction in industrial activities, mean always a wholesome, effective and worth-while national existence; the absence of these things means always an unwholesome, impotent, helpless and worthless national existence.

Germany has had and still has industrial obedience to competent and loyal directing executives, and to this fact she owes a national effectiveness which no one can question. Had her executive direction been equal in its wisdom to its competence, Germany would have been the most admirable instead of the most despicable of nations.

It was the epitome of unwisdom for her to use her efficiency and effectiveness solely as an instrument with which to injure humanity, and thus antagonize every right-thinking human being.

There is no wisdom which does not recognize as fundamental the obligation to serve humanity, to add to the desirability of human existence for this and succeeding generations.

Trade Acceptances

Trade-Acceptance System Contrasted with Open-Account Methods

By George S. Cole*

¶ A trade acceptance is a time draft or bill of exchange drawn by the seller of merchandise on the buyer for the purchase price of the goods, and accepted by the buyer, payable on a certain date, at a certain place, designated on its face.

¶ A note is drawn BY a person, whereas a trade acceptance is drawn ON a person.

¶ The trade acceptance performs a different function from a promissory note, as a note is generally used in borrowing money and in settlement of past-due obligations, whereas a trade acceptance bears on its face evidence that it is drawn by the seller of merchandise on the purchaser for the purchase price of the goods sold, and, when accepted, constitutes a valid promise to pay on a specified date, and is a negotiable instrument, and as binding upon the acceptor as a promissory note.

¶ A trade acceptance should have nothing to do with or be employed in any class of transaction except that concerning purchase and sale of goods.

¶ The credit represented by open book accounts remains tied up and practically unavailable so long as it continues in that form, until liquidated at or after maturity; whereas, by converting the open book account into a trade acceptance the credit represented by the account becomes immediately available for additional use by the seller, because the trade acceptance is readily discountable with banks, and the owner can secure the proceeds for reinvestment, thus keeping at work the amount of capital represented by the open account.

¶ The open book account, with its losses of interest on overdue accounts, of waste and loss from bad debts, has been a defect in our business system, and has made the cost of distribution from manufacturer to consumer unnecessarily expensive.

BY slow degrees the trade acceptance idea is taking root in commercial America and supplanting the old open-account credit practice. Large, progressive mercantile houses and manufacturing establishments are substituting the practical working of this reform movement, for they realize the advantages that will accrue to themselves, their customers, and the country at large, by its general adoption.

Many concerns, however, dislike to break away too suddenly from an old-established custom, for fear of disrupting existing conditions, under which, perhaps, they are so prosperous that they think it advisable to let well enough alone. Many, too, fear to offend an old customer who has always been good by asking him to sign an acceptance. They fear it may be construed as an imputation on his credit. With the uninformed customer this might be what would happen, although the number of business men who are now uninformed on the principles of the trade acceptance is comparatively small.

Chain of Credit Acceptances

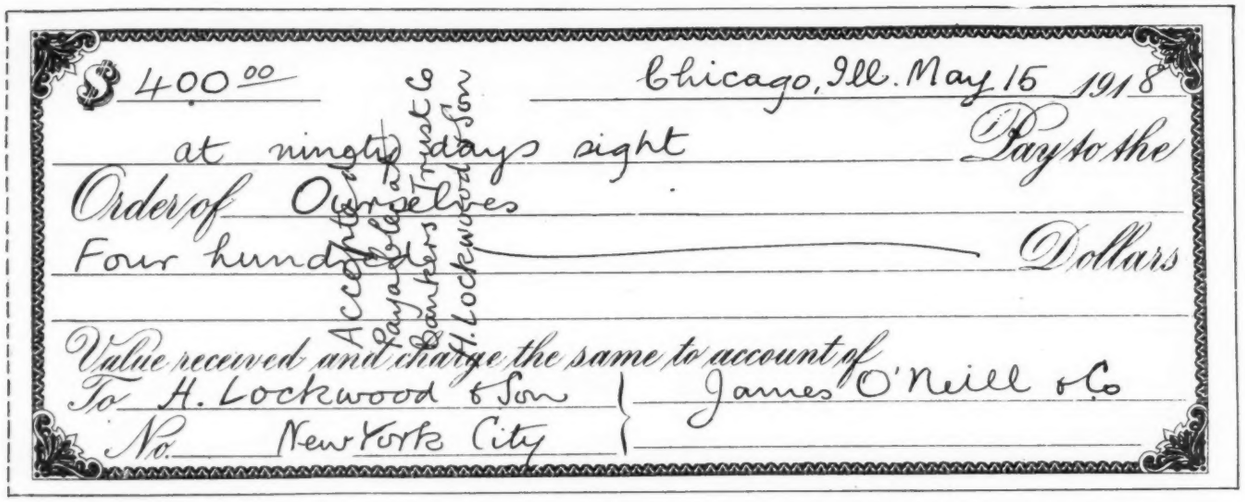
The trade acceptance idea, when fully developed in this country, as it has been in Europe for a long time, will constitute a chain of credit acceptances that starts with the producer of raw material and extends through all the transactions until the goods reach the final consumer. The great advantage of a uniform adoption of this practise would be that it places the financing of each party to the transaction squarely on himself or herself. Under the open-account credit practise this financing is often placed, of necessity, by the buyer on the seller, and custom and usage have made the seller stand for it.

Federal Reserve Board Definition

A trade acceptance is a time draft or bill of exchange drawn by the seller of merchandise on the buyer for the purchase price of the goods, and accepted by the buyer, payable on a certain date, at a certain place designated on its face.

The trade acceptance is defined by the Federal Reserve Board, Regulation A, series 1917, as a draft or bill of exchange drawn by the seller on the purchaser of goods (goods, as used in this regulation, shall be construed to include goods, wares, merchandise, or agricultural products, including livestock) sold, and accepted by the purchaser; and a bill of exchange, within the meaning of this regulation, is defined as an unconditional order in writing ad-

*Editor's Note—George S. Cole is secretary of the Automotive Electric Association.



Typical form of Trade Acceptance. When a draft is "accepted," as indicated by the indorsement across the face, it then becomes "two-name paper" and may be discounted at the bank receiving the Trade Acceptance

dressed by one person to another, other than a bank, signed by the person giving it, requiring the person to whom it is addressed to pay in the United States, at a fixed or determinable future time, a sum certain in dollars to the order of a specified person.

To be eligible for purchase or discount at a Federal Reserve bank a trade acceptance should present prima facie evidence that it was drawn by the seller on the purchaser of goods sold, and must have a maturity at time of purchase or discount of not more than 90 days, exclusive of days of grace, except that if drawn for agricultural products, or against the sale of live stock, it may have a maturity at time of discount of not more than six months, exclusive of days of grace. We wish you to observe that a trade acceptance is not a sight draft nor a promissory note.

Acceptances Differ from Notes

As one authority has observed, a note is drawn *by* a person, whereas an acceptance is drawn *on* a person. The trade acceptance performs a different function from a promissory note, as a note is generally used in borrowing money and in settlement of past due obligations, whereas a trade acceptance bears on its face evidence that it is drawn by the seller of merchandise on the purchaser for the purchase price of the goods sold, and when accepted constitutes a valid promise to pay on a specified date, and is a negotiable instrument, and as binding upon the acceptor as his promissory note, but performs a different function from the note. This is an important feature to remember: that is, that a trade acceptance should have nothing to do with or be employed in any class of transactions except that concerning the purchase and sale of goods.

It should not be given for borrowed money or past-due accounts, but should represent current transactions only.

The trade-acceptance plan is not a new scheme or method, as it was used to some extent in the early history of our country. The Civil War disturbed the financial situation at that time, and the risk and uncertainty attending the granting of long credits led to the introduction of offers of large cash discounts to insure prompt settlement in cash; and gradually the open book account with the cash discount superseded the use of the trade acceptance.

It is said that business men of no other nation conduct their business as we do in the United States. In England, Germany, France, and other countries, if a merchant has not sufficient cash to pay for merchandise, instead of borrowing from his bank on his promissory note, as is the custom here, he gives a note to the seller, or more commonly the seller draws a time draft—which we would call a trade acceptance—on the buyer, and then the draft or trade acceptance is discounted at the bank.

Such paper in England is known as a bill, whereas we usually characterize it as a draft. We learn that large commercial banks in London, Paris and Berlin hold in their portfolios large quantities of these bills, which are constantly maturing, and in case of need they indorse them to the central banks for rediscount.

The method of using the trade acceptance may be illustrated as follows:

The seller, when rendering an invoice for any single purchase of merchandise, if the amount is reasonably large, will accompany the invoice with the trade acceptance, duly filled out for the amount due; or, in cases where the buyer purchases of the seller several bills of small amounts during the month, the seller, when rendering a monthly statement, will accompany the same with a trade acceptance form duly filled out for the total amount. In other words, when a great many purchases are made during the month, of small amounts, these are bunched, and covered by one trade acceptance.

Weekly and Monthly Trade Acceptances

I learn that some houses send a trade acceptance weekly covering a large number of small purchases, while other houses do it monthly. Upon receipt, the buyer has the option of either paying the gas bill, deducting such cash discount or premium as may be allowed, or he may accept the trade acceptance by writing across its face the date and the words "Payable at —— Bank," and then signing and returning it to the seller, thus closing the transaction. The seller will then either retain the acceptance in his portfolio until a short time before it is due, when he will forward it for collection through the bank designated in the acceptance, or, if the seller finds himself in need of funds, he may, instead of borrowing from his bank on his single-name promissory note, prefer to take a number of trade acceptances and discount them with his bank, or sell them in the open market to note brokers or dealers in mercantile paper, thus converting into available live assets the dead capital which is now practically unavailable, being tied up in open book accounts.

As a matter of law, as passed by an act of Congress,

the place of payment of a trade acceptance, unless a different place is designated on its face, is at the office of the acceptor; *id est*, the buyer of the goods. The acceptor may, however, if he so desires, designate in his acceptance his own bank as the place of payment, providing the bank is located in the same city or town, as his principal place of business.

In case the acceptor—*id est*, the buyer—desires to have the acceptance made payable at a bank located in some other place than his own city, he must arrange with the seller to have such a designation or authority to make it incorporated in the body of the trade acceptance at the time it is made by the seller; otherwise, it may not conform to the negotiable instruments law.

It is important to remember that the Federal Reserve banks may purchase trade acceptances in the open market, whereas they cannot purchase notes, no matter how strongly they may be drawn and indorsed, and that open-market rates are generally well below the discount rates of all central banks in Europe and of the Federal Reserve banks of the United States. We understand that the present prevailing discount rate on trade acceptances by the Federal Reserve Bank, Cleveland district, where they do not run for a longer period than 90 days, is 4 per cent.

What Constitutes an Open Market

In the previous paragraph we referred to the term open market. This may not be described as a space set aside for the transaction of business, but is rather that section of a financial district in which are located houses which, together with their clients, wherever located, constitute the open market in which bankers' acceptances, trade acceptances, and other prime commercial instruments are bought and sold.

Dealings in commercial paper in the open market in the United States have long been confined chiefly to the sale of single-name promissory notes, which, once having been purchased by a bank, were rarely, if ever, sold. It has been authoritatively estimated that the volume of paper revolving and circulating in London before the present war was normally from $1,500,000,000 to $2,000,000,000. The rates that obtain in such a market are ordinarily stable, and for prime paper average somewhat below the discount rates. The great commercial advantage accruing to any country that can maintain a stable, free and open market must be apparent to every user of credit, as to such a market are attracted the idle funds of the world. I have recently read that a market similar to the London market is in process of establishment in New York. On the London market it has been the rule for years to limit the amount of a single acceptance to $5,000. The reason for this is that acceptances of $5,000 and less are more quickly negotiable than are those of larger denominations. In the New York market, where the London practice is being followed to some extent, acceptances of $5,000 or less are most in demand.

In International Trade

The principal obstacle encountered by manufacturers in the United States who have desired to enter the export field has been their inability to grant the same long-term credit as could be granted by their competitors abroad. The usual custom has been to require payment in cash at New York against documents. It seems that the logical way out of this difficulty is to adopt and use the acceptance credit. The exporter thus avoids the necessity for locking up his capital. The credit which is required to enable the foreign importer to pay for his goods is established by drawing at 60 or 90 days' sight on a New York accepting bank or trust company, the acceptance being discounted by it at a given fixed rate. These acceptances, based principally on the commodities exported from the country, form a valuable security. This was particularly evident in London at the outbreak of the war, when acceptances amounting to more than $500,000,000 were in circulation. The greater part of this has, of course, been liquidated by the self-liquidating process; that is, by the sale of the commodities which form the basis of the transactions, thus proving the soundness of the acceptance business in general.

Acceptance Information Constantly Sought

A significant indication of the growing interest in the acceptance business in this country is that in various sections of the United States specific acceptance information is constantly being sought from Federal Reserve banks and from the trust companies making a business of accepting.

The trade-acceptance proposition, no doubt, seems new to all of us, but in compiling this information I find that the volume of business done through the use of trade acceptances is great instead of small. The banks of New York, on Sept. 12, 1916, had in their portfolios $49,190,200 of trade acceptances; and in the same year, on Dec. 27, these trade acceptances had grown to $60,218,800.

These figures were very surprising to me at the time, as I did not know that trade acceptances were so popular a year ago. On Nov. 29, 1916, the combined report of trust companies in New York City showed a total of $77,540,200 under customers' liabilities on trade acceptances, as compared with $59,586,900 in September, 1916.

In view of the tendency shown by these figures we can readily accept the following statement by a concern which uses the trade acceptance regularly:

Acceptances Freely Given

"Except where unusual circumstances have existed, we have not found it necessary to offer any special inducement to obtain acceptances from our customers. The maximum concession we have granted has been a few days' extra time. This seems to prove that the buyer understands that he will benefit in other ways."

The credit represented by open book accounts remains tied up and practically unavailable so long as it continues in that form, until liquidated at or after maturity; whereas, by converting the open book account into a trade acceptance the credit represented by the account becomes immediately available for additional use by the seller, because the trade acceptance is readily discountable with banks, and the owner can secure the proceeds for reinvestment, thus keeping at work the amount of capital represented by the open account.

Acceptances are sold on a discount basis, and a quotation of 3 per cent means that the face amount of the acceptance is discounted at the rate of 3 per cent per annum for the number of days the bill has to run; for instance, the purchaser of $10,000 worth of trade acceptances running 90 days would pay $99,250. When the acceptances matured he would receive $100,000.

In checking over our book accounts with our accountant, under the open book account system, a great many of our customers are not taking their cash discount promptly; that is, their checks never reach us within the 10-day period. In approximately 85 per cent of the cases the checks are made out on the 11th, mailed on the 12th, and received by us from 13 to 14 days after the date of the invoice, where the discount is a certain per

cent 10 days. We have also had the personal experience of receiving notes in payment of invoices, and the notes were made out for the face value of the invoice less 2 per cent. No doubt some of the rest of you have had the same experience within the last six months. The trade acceptance would cure this trouble.

Old Methods of Long Standing

Manufacturers have become so accustomed to their present credit methods that many believe these cannot be bettered. The fact remains that there are serious defects in the present methods which should be and can be corrected.

The subject of credits in our financial life should be given more attention. In our commercial transactions all the terms and details are generally definitely expressed and understood, and are usually based on sound business experience with the exception of the credit arrangement. Under the present methods, credits are placed in open book accounts, the date of payment of which, while definitely stated and understood, is left wide open, and in many cases the date of payment is postponed and ignored.

The open book account, with its losses of interest on overdue accounts, of waste and loss from bad debts, has been a defect in our business system, and has made the cost of distribution from manufacturer to consumer unnecessarily expensive.

When a buyer fails to pay his bills at a specified time he is forcing the seller to carry the account on his own capital, with no compensation therefor in the selling price of the goods sold. Each day that passes after maturity means a shaving down of the seller's profit. A generous credit granting in this country has dulled the minds of merchants regarding the importance of meeting their obligations promptly.

It is well for the business man, in considering the value of the trade acceptance in its relation to business, to bear in mind the bigger and broader view, and not to limit his horizon to his own affair.

An Acceptance Is Like an Order

The signing of the trade acceptance by the buyer is no different in its moral effect than the signing of the order specifying the kind and quality of the goods. In signing an order, whether by letter or otherwise, the buyer obligates himself to purchase the quality and quantity of goods specified, the date of shipment and all the other details, and in signing the trade acceptance he simply confirms the agreement as to the terms of payment.

The trade acceptance is a form of commercial paper the use of which will do more to increase American financial efficiency than almost any other factor, whereas the open book account is wasteful and inefficient.

It has been estimated by bankers that the amount represented by open book accounts in connection with business in the United States amounts to approximately $4,000,000,000. If the amount of this country's internal annual commerce could be known, some idea could be had of the amount of real commercial paper which could be based on such a tremendous volume of transactions. If the big credits or open book accounts of the country could be converted into trade acceptances it would make an enormous total, and this credit, in negotiable form, would greatly strengthen the credit resources of the country.

I heard a banker state recently that from two to three times the volume of business could be done on the same capital by the use of the trade acceptance instead of open book accounts; that it can be done as safely and conservatively, and that it should tend to materially lower the cost of doing business, assure reasonable dividends on capital, and to lessen the high cost of living.

Those who settle by trade acceptance will put themselves into a class of preferred buyers, the same as those who discount for cash as against those who, declining to use trade acceptances, insist upon a long open book account. This fact will, no doubt, be recognized by the mercantile agencies in their ratings, with the inevitable result that goods will be sold to those who demand long credit only on the basis of their paying higher prices than those who discount, or use trade acceptances.

Their use will be a check on overbuying, as the buyer's ability promptly to meet his obligations when they come due will tend to control the volume of his purchases. Those who pay bills promptly, taking the cash discount or premium, are not expected to use the trade acceptance to any great extent.

Book accounts may be high grade and absolutely good, but they are not readily converted into cash. The sale and distribution of merchandise is a most important part of our business system, and the accounts created thereby should be liquid, and not tied up.

Establishes Accuracy of Account

The use of the trade acceptance establishes quickly the correctness of the account as between buyer and seller, obviates the tendency to friction over differences not reported until the account is due, reduces the expense of collection, and lessens the cost of conducting business. To carry on the open book account system the sellers sometimes strain their own credit in order to extend credit to the buyer for an indefinite time, frequently without interest, security, or even any evidence of the sale, a custom which often results in loss by nonpayment of the account.

Trade acceptances are what the banker calls two-name paper—that is, drawer and acceptor—and as such are considerably more desirable paper for bank investment than single-name paper; that is, a promissory note with no indorser.

The national banks are limited by law from loaning to any one person or firm more than 10 per cent of the bank's own capital and surplus, but the bank is not subject to this limitation in buying trade acceptances, as referred to in the Revised Statutes, U. S. National Bank Act, section 5200.

If the buyer meets his trade acceptances when they mature he will establish and confirm his credit, and should he, on occasion, wish to postpone date of payment of the trade acceptance, he should be able to secure an extension of credit by giving a promissory note with interest.

Buyers, knowing that their obligations will mature at a certain definite time, and in many cases will be discounted at a bank, thus putting their credit to the test, would realize the necessity of meeting their obligations when they come due, would be more prudent in selling on long credit, more careful to abstain from overstocking, watch more closely their collections, and be more apt to pay their own debts promptly; thus the credits of the entire country would be placed on a safer and sounder basis.

The trade acceptance will only be offered to buyers of approved credit and standing, because the seller's own standing will be reflected in the character of the acceptances offered to his bank. With this in mind, it might be well to answer an objection to the trade accept-

(*Continued on page* 1025)

Simple Lifting Device on Motor Plow

Special Oliver Plow Made for Fordson Tractor Is Light in Weight, Handy to Operate and Free from Side Draft

OF commensurate importance with the development of the Fordson tractor is the coincident development of the Oliver No. 7 two-bottom tractor gang plow by the Oliver Chilled Plow Works, South Bend, Ind. The No. 7 plow is designed for use especially with the Fordson tractor. As plowing is by far the most important work a tractor is called upon to do, its highest efficiency and economy to the farmer depend largely upon the plow which is pulled behind it.

The new Oliver No. 7 tractor plow has a simple lifting device. It levels automatically and has no side draft.

By employing a heat-treated alloy steel the Oliver Chilled Plow Works have reduced the weight of the No. 7 plow 25 per cent below that of ordinary two-bottom engine gangs of similar capacity and still have retained strength and rigidity. In competitive test with the standard two-bottom engine gang made by the same company, in stony and stumpy ground, along old hedge rows and fence lines, the No. 7 came through the tests, despite its lightness, with less damage and breakage than was experienced with the standard type.

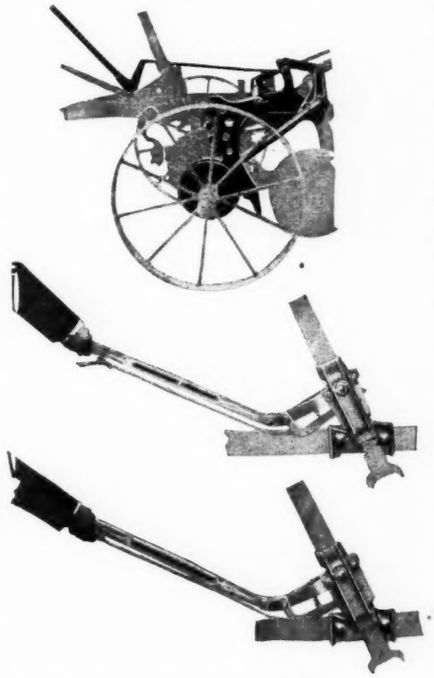
Details of Equipment

The No. 7 plow is regularly equipped with the NC23 14-in. general purpose bottom shown in the illustration. This bottom has the Oliver quick detachable share, which makes possible a change of shares in a few seconds' time and without the use of a wrench. Standard equipment also includes the Oliver rolling coulter and jointer, which together with the wide rake of the plow and the height of the beam, insures a clean field surface with all trash and weeds at the bottom of the furrow.

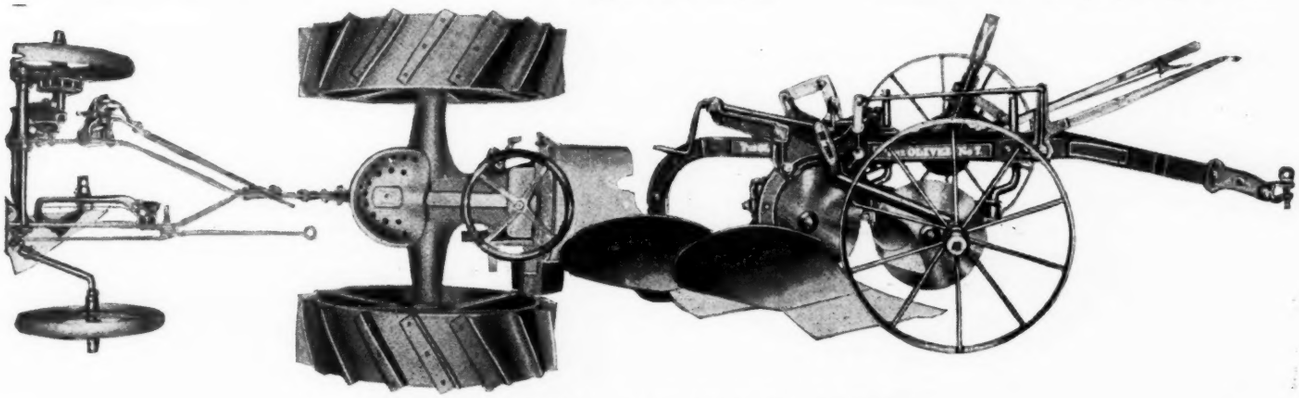
The illustration shows that the No. 7 plow operates in perfect line with the draft of the tractor, thus eliminating all side draft and insuring economy of operation. A lever projects forward from the frame of the plow to within easy reach of the operator. This is connected with a powerful jack by means of which the depth of plowing is regulated. The illustration shows how the two operations of increasing and reducing the depth of plowing are controlled by the one lever.

The lifting device, also shown in the illustration, operates only when the bottoms are being raised. The locking device consists of a double link which drops over the center when locked in place. The action of the lift is positive. The raising of the lever moves the teeth of the lifting cam into mesh with the gear on the land wheel. The power for lifting comes from near the center of the axle and gives the greatest possible leverage to do the work. When lifted the point of the front bottom is 8 in. above the level of the ground and the point of the rear bottom is even higher. This is exceptionally high and gives ample clearance for turning corners, traveling over roads, etc.

Through proper adjustment of the leveling device the bottoms are automatically kept level regardless of the depth of the furrow, and all tendency to wing is eliminated. This feature enables the operator to plow at any depth he desires without being compelled to manipulate a leveling lever every time he changes depth.



Showing lifting device of Oliver plow in two different positions



Illustrating how side draft on the tractor is eliminated

Abrasive Production Increases

TREMENDOUS expansion in manufacturing in 1917, particularly in the steel and metal industries, is reflected by the increased production of high-grade abrasive materials in the United States. A preliminary compilation by Frank J. Katz, United States Geological Survey, Department of the Interior, of reports on the production of emery, corundum and artificial abrasives in 1917 indicates a total of 72,276 short tons, valued at $8,325,312, which is an increase of 33 per cent in quantity and 172 per cent in value as compared with 1916.

The production of emery from the Peekskill district, New York, amounted to 14,842 short tons, very little less than in 1916; the production of corundum in North Carolina was 820 short tons, a large increase over 1916; and the production of crude artificial abrasive materials in the United States and Canada, which are largely prepared for use in the United States, amounted to 57,614 short tons, which was 48 per cent more than the production in 1916.

Specifications for Mahogany Lumber for Use in Propeller Construction

FOLLOWING are the specifications for mahogany for propeller construction adopted by the International Aircraft Standards Board:

GENERAL.—1. (*a*) The General Specifications, 1G1, shall form, according to their applicability, a part of these specifications.

(*b*) This specification is drawn to govern the quality of mahogany lumber supplied for the construction of propellers.

(*c*) Only true mahogany (*Swietenia mahogoni*) or such substitutes as are expressly approved may be supplied.[1]

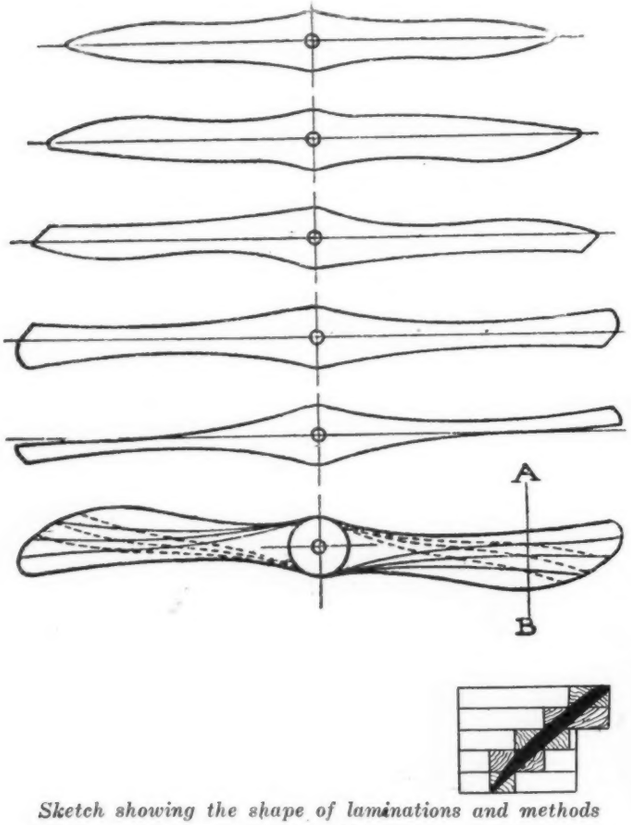
GRADE.—2. (*a*) Each board supplied shall yield one or more laminations free from defects, and the waste on each board shall not exceed one-third of the surface measure of the piece.

(*b*) Shipments on this specification must contain all lumber of better grade that has been produced in cutting the logs at the mill. No portion of higher grade material shall be sorted out and retained by the mill.

GRAIN.—3. All boards shall be reasonably straight grained and suitable for propeller purposes. Quarter-sawed lumber is preferred.

[1]African mahogany (*Khayasenegalensis mahogoni*) is approved by the United States Signal Corps.

[2]National Hardwood Lumber Association rules, August, 1917, page 10, "Measurement:" "In the measurement of lumber of random widths, fractions of over one-half foot, as shown on the board rule, must be counted up to the next figure; fractions of exactly one-half foot and less, as shown on the board rule, must be counted back to the next lower figure. Tapering lumber in standard lengths must be measured one-third the length of the piece from the narrow end."



Sketch showing the shape of laminations and methods of assembling

TEXTURE.—4. Boards containing brashy, doty, or punky wood will not be accepted.

DIMENSIONS.—5. (*a*) Unless otherwise specified in the order, dimensions shall be as follows:

(1) *Thickness.*—Rough, green lumber must be full 1 inch thick.

(2) *Width.*—No board shall be less than 8 inches wide and not more than 10 per cent of the resulting laminations shall be less than 9 inches wide nor more than 25 per cent less than 10 inches wide.

(3) *Length.*—No board shall be less than 8 feet long and at least 80 per cent of the resulting laminations must be 9 feet long or over.

(*b*) The widths most desired are 10 to 14 inches with the greatest percentage between 12 and 14 inches.

(*c*) Lengths and widths shall be measured according to National hardwood rules.[2]

SHIPMENT.—6. Rail shipments shall be made in closed cars, protected from the weather. The lumber must be carefully piled to avoid damage in transit.

INSPECTION.—7. (*a*) The inspector shall have free access to all parts of the mills where this lumber is being manufactured and shall be afforded every facility to satisfy himself that the lumber conforms to this specification.

(*b*) This specification shall be subject to construction and interpretation by the inspection department of the purchaser.

—

Book Review

Unified Accounting Methods for Industrials, by Clinton E. Woods, Advisory Engineer, Remington Arms Union Metallic Cartridge Co.; 484 pages; half leather binding; price, $5. Published by The Ronald Press Co., New York.

Mr. Woods has written this book after an experience of 20 years with concerns employing from half a dozen to twenty thousand men. He says that the unified method of accounting he presents furnishes an accurate instrument for measuring results. It is in the form of a detailed accounting system fitted to every element in a business and governed in turn by a set of controlling accounts. The system is no more expensive to install and operate than are the fragmentary systems in use in so many factories to-day.

In scope the book is limited to industrial or manufacturing activities, although the principles enunciated are capable of being applied in a broader field. Following a constructive consideration of the principles of unified accounting, there follow 126 pages of suggestive forms, taken from practice, which illustrate the possibilities of the system discussed.

—

Reduction in Unfilled Steel Orders

THE unfilled tonnage of the Steel Corporation on the first of the month was reported at 9,056,000 tons, compared with 9,288,000 tons a month ago and 3,251,000 tons a year ago. This decline in unfilled tonnage indicates not so much a decline in business as increased production and more prompt deliveries. Quick deliveries are of the greatest importance, as probably 70 per cent of the corporation's output is intended for Government use. Structural steel bookings for March totaled 85,000 tons, compared with 100,000 tons in February and 122,000 tons in March a year ago. Of the bookings during March about 75 per cent was in Government orders.

Design of Automobile Glass Fronts

Part III

Defects Found in Designs of Windshields Now Used

By Karl Feilcke

A CLOSE inspection of these shields shows that defects arising from a misunderstanding or ignoring of the fundamental principles involved and other engineering considerations are numerous. These defects are to be found both in detail construction and general arrangement, and the most frequent ones are enumerated below, together with suggestions how to eliminate them:

Defect No. 1 is that the average glass front has too weak side arms and glass frames, as manifested by excessive rattles and vibrations.

The forces attacking a glass front are the wind pressure and those resulting from the support of the front end of the top (see Fig. 18). Their direction is easily determined, but their magnitude is difficult to estimate, and the size of the different parts of a glass front have to be determined therefore mostly by experience.

The wind pressure exerts a considerable strain at higher speeds on the glass frames, side arms and joints, and in order to withstand this pressure and prevent vibration the channel of the glass frame should be of ample size, if possible not less than ¾ inches in width on shields which are more than 40 inches wide. The upper glass, which has to be hinged at the upper end, should not be able to swing backwards, but rest on stops in the side arms when in the plain upright position (see Fig. 18), so that the bending moment created by the wind pressure is taken up directly by the side arms and not by the locking mechanism or friction in the journals.

Stops cannot be used on the lower glass, however, as it has to swing back to assume ventilating position, but the strain on the journals can be relieved by locating them approximately in the center of the glass, so that two opposing turning moments are created by the wind pressure, which will equalize each other to some extent. This is especially necessary on a shield with automatic locking devices in the journals as the wind pressure is liable to throw it open at high speed if the forces are not balanced. Another great strain is imposed on the windshield side arms by the side sway of the one-man top on rough roads. Stiffness in a sideways direction is often neglected by designers, and some glass fronts have ridiculously weak side arm sections.

Defect No. 2 is that the average glass front is not sufficiently water-tight during a heavy rain, and that considerable water leaks through the clear vision slot between the upper and lower glass.

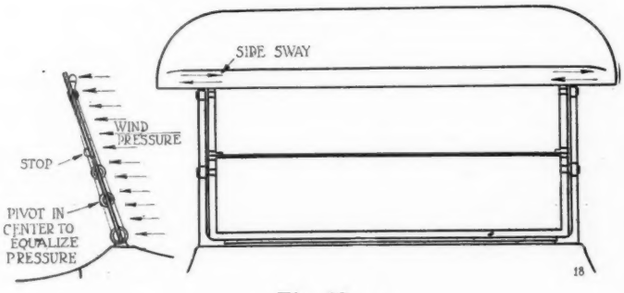
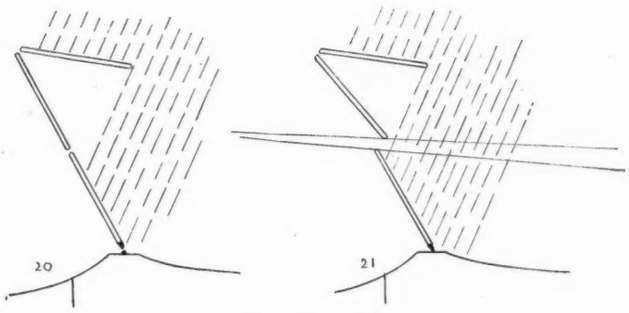


Fig. 18



Figs. 20 *and* 21

It is self-evident that the clear-vision position cannot be used during a very heavy downpour, for the water falling on the upper glass forms large drops on its lower edge, which blurr the driver's vision and are blown through the clear-vision slot by the wind. But even in the plain upright position the slot is wide enough to admit a considerable amount of water during a severe rain storm.

Methods Used to Remedy Defect

The following methods have been tried to remedy this defect:

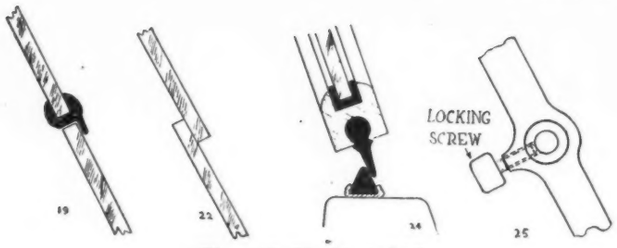
(a) A rubber strip is inserted between the glasses as shown in Fig. 19 and the slot closed up in that manner.

This cannot be considered a good solution, however, as the rubber strip seriously interferes with the vision of the driver if it is permanently attached to the glass and causes too much annoyance if it has to be put in place every time it is needed.

(b) Another method of preventing leakage of water through the clear-vision slot into the front compartment is to be found in the three-piece windshield, which has been extensively used on closed cars. The three-piece shield consists of one lower and two upper glasses arranged as shown in Fig. 20. The additional upper glass is folded up so that it forms a roof which catches all the water and snow and keeps the inner upper glass comparatively clear during a rain storm. When ice, frost or mist, however, covers both upper glasses the clear-vision position has to be resorted to again, as shown in Fig. 21. While the three-piece shield is expensive and heavy, it solves the problem fairly well as far as the closed car is concerned, but it is not suitable for the open car, as the third glass interferes with the different positions the glass front has to assume.

(c) A third method of keeping the water from leaking through the slot is to let the upper glass overlap the lower one, as shown in Fig. 22.

This method is effective if the overlapping is done right, that is, if the upper glass lays tight on the lower one so that there is no gap whatever, but it requires ex-



Figs. 19, 22, 24 *and* 25

cellent workmanship to get such a good fit between the two glasses. The objections to the overlapping glass are that a larger opening is required to give the same clear vision slot and that the upper glass has to be moved before the lower one can be put in ventilating position.

These objections can be partly overcome by making the overlap small (not more than ⅛ inch) and by grinding the edges of the glass at an angle corresponding to the line of vision.

Solving Water Leakage Problem

(d) The best and simplest solution of the water leakage problem is to use the plain two-piece shield with as small a gap between the two glass plates as possible, in conjunction with methods to keep an excessive amount of water from getting on the glass front at all. Owing to the pitch of the top or the roof of the closed car, a very considerable area of the roof sheds its water towards the front. With an average seven-passenger touring car having a top and windshield of the dimensions shown in Fig. 23, we find that during a heavy rain (3 inches of water in an hour) 775 cubic inches of water are caught in an hour by the upper glass of the windshield proper, assuming that two-thirds of its area is exposed to the rain, and that 9000 cubic inches of the water are caught in the same time on that part of the top which pitches down toward the front. If we figure that only one-half of the water coming down on that area is shed over the glass front we have 775 cubic inches of water on the windshield against 4500 cubic inches coming from the top. These figures show that conditions could be very much improved by not letting the water from the top get on the windshield at all and using the extension of the top over the shield like the third glass of the three-piece shield.

Defect No. 3: The connection of the average glass front with the folding top is not sufficiently airtight.

The necessity of putting the upper glass in two different positions, and the practical impossibility of placing the journals of the upper glass in line with the upper edge of the glass frame, cause a change of position of the upper edge of the frame in relation to the top and make it difficult to secure permanently an airtight connection. The latter is especially desirable at this place, for cold air coming in under the top is liable to cause a very disagreeable backdraft, especially on a car with a short top, *i.e.*, a two or four passenger car.

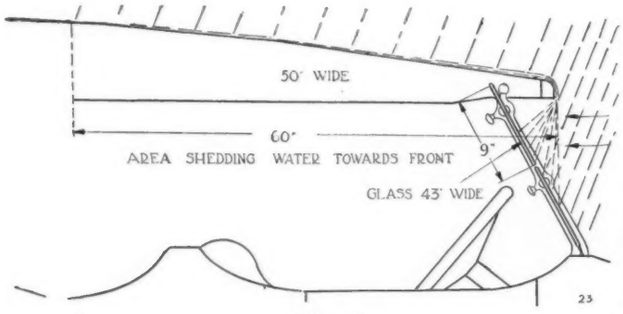


Fig. 23

This defect in the majority of cases is overcome by attaching a flap to the front bow of the top, which is buttoned by means of curtain fasteners to the upper edge of the glass frame, and has enough slack to accommodate both the upright and clear vision position.

While this flap solves the problem in a fairly good manner, the fastening and unfastening of same is very inconvenient and improvements could undoubtedly be made here perhaps by joining the two side arms permanently by a bar, which automatically makes an airtight connection with the top as well as the upper glass in its different positions.

Watertight Joint

Defect No. 4: The connection of the average glass front with the body is not sufficiently watertight and the body cowl is frequently of a shape which makes the proper realization of the ventilating position impossible.

The edge of the lower glass should make a water tight connection with the body cowl when in the upright position, and form a slowly and evenly increasing gap with the edge of the cowl when moved backward into ventilating position. A watertight joint is best attained by two rubber strips arranged as shown in Fig. 24, both of which are pliable enough to let the rubber attached to the lower glass pass back and forth over the rubber attached to the body. As this puts a severe strain on the rubber strips and causes a quick deterioration if they are not fitted just right, the lower glass on closed cars is sometimes arranged so that it can be lifted over the rubber strip on the body.

The best ventilating conditions are attained by making the lower edge of the glass front and the cowl straight, and placing the glass close to the edge of the cowl, so that the amount of ventilation wanted can be delicately regulated by the gradual increase in the width of the opening.

The straight, horizontal cowl, while giving the best ventilating conditions for the windshield, does not fit in well with the stream line style of body and has been replaced in many cases by the barrel shaped cowl, which, however, does not furnish as good a foundation for the shield. The curved edge of the cowl makes a gradual increase in the opening and consequently a sensitive regulation of the draft impossible, and on some of the higher grade cars a special slot is therefore provided in the cowl, the straight edge of which is used for ventilating purposes. This is, of course, an expensive construction.

Connecting-Up Side Curtains

Defect No. 5: The average glass front has poor facilities for connecting up the side curtains.

On many shields the operating and tightening mechanism for the journals, consisting of wing nuts, bosses, screws, etc., are located on the outside of the side arms, which makes it impossible to get a nice and clean fit for the side curtains and prevents a change of position once the curtains are in place. But it is just during the changeable weather in spring and fall when people drive with the side curtains up that changes in the windshield positions are most desirable.

The remedy for this defect is, of course, the use of side arm joints, which are located on the back side of the arms. They give a smooth surface to the side arms for the fitting of curtains and also can be operated with the latter in place. Such joints are already in use on some cars, and one of them is illustrated in Fig. 25.

(*To be continued*)

Fundamentals of Engine Practice Reopened for Discussion

Changes in Valve Location, Manifold Layouts and Possibilities of Overhead Camshaft Types Among Questions Now Considered Pertinent

By J. E. Schipper

GASOLINE engine design has entered upon another period of unsettlement. Three years ago engine practice was more standardized than it is to-day. At that time it almost looked as if the major characteristics of gasoline engines had reached the same quiescent stage as those of electric motors. To-day conditions are different.

No influence has been as great as that of the decreasing volatility of fuel. The necessity of efficiently vaporizing a fuel which is inherently more difficult to handle has led to developments which are improvements not only from a thermal standpoint, but also from the mechanical point of view.

The greatest evidence of unrest in design is in differences of opinion which leading engineers have on subjects which are practically fundamental in gasoline engine practice. Valve location is a typical example. The use of the overhead valve has increased within the past year to a notable extent, yet it is not universally believed in by any means.

Another specific point upon which disagreements are marked is the use of the overhead camshaft. This practice, which is quite typical of airplane work, has not made any marked progress during the past few years, but engineers who do not use it are predicting for it a great future.

Handling of Fuel

These are two specific examples of the differences in thought which center about the handling of the fuel and, mixture, starting with the carbureter, running through the gas passages and ports, the valves, and finally the combustion chamber. In view of the interest in this part of engine development, it will be well worth while to trace a few of the thoughts which arise in this connection.

Before going into details, it should be pointed out that the primary object in view in designing this part of the engine is to insure maximum filling of the cylinders on the intake stroke. A great deal depends upon whether or not the engine is designed for a passenger car or a truck. In passenger car engines the maximum torque and speed are carried up as high as possible, whereas in truck and tractor engines the desirable maximum torque is held around 1000 r.p.m., or in smaller engines at 1000 ft. per min. of piston speed. This has a direct bearing on the location of the carbureter. In engines for passenger vehicles, it is usual to have the carbureter as close to the gas intake valve as possible, to secure maximum torque and horsepower at the higher speeds. It is also desirable to avoid all right-angled bends, and where there are turns, to make the radius as large as possible, using as large a valve with as great a lift as permissible from the viewpoints of valve noise and valve spring pressure required. For truck and tractor engines the gas intake passages may be somewhat smaller and the valve lift less, which gives a higher gas velocity and results in easier starting.

Engines of this class in commercial use are designed so that the power curve will peak at about 13,000 ft. of gas velocity per minute and give their maximum torque at about 1000 r.p.m., considering engines of from 3½ to 4½-in. bore.

From these statements it is quite apparent that the difficulties of securing proper filling and desired output from a given combustion chamber size are greater with passenger engines than with truck and tractor engines, and it is for this reason that designing engineers are greatly interested in the questions of the respective merits of various types of valve action and different port dimensions.

Taking the opinion of the engineering fraternity as a whole, it is conceded to be possible to secure a higher

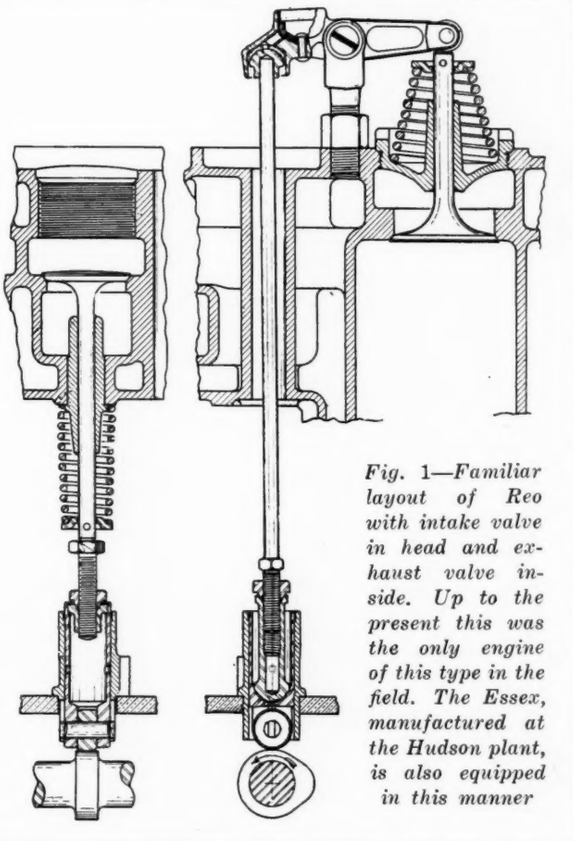


Fig. 1—Familiar layout of Reo with intake valve in head and exhaust valve inside. Up to the present this was the only engine of this type in the field. The Essex, manufactured at the Hudson plant, is also equipped in this manner

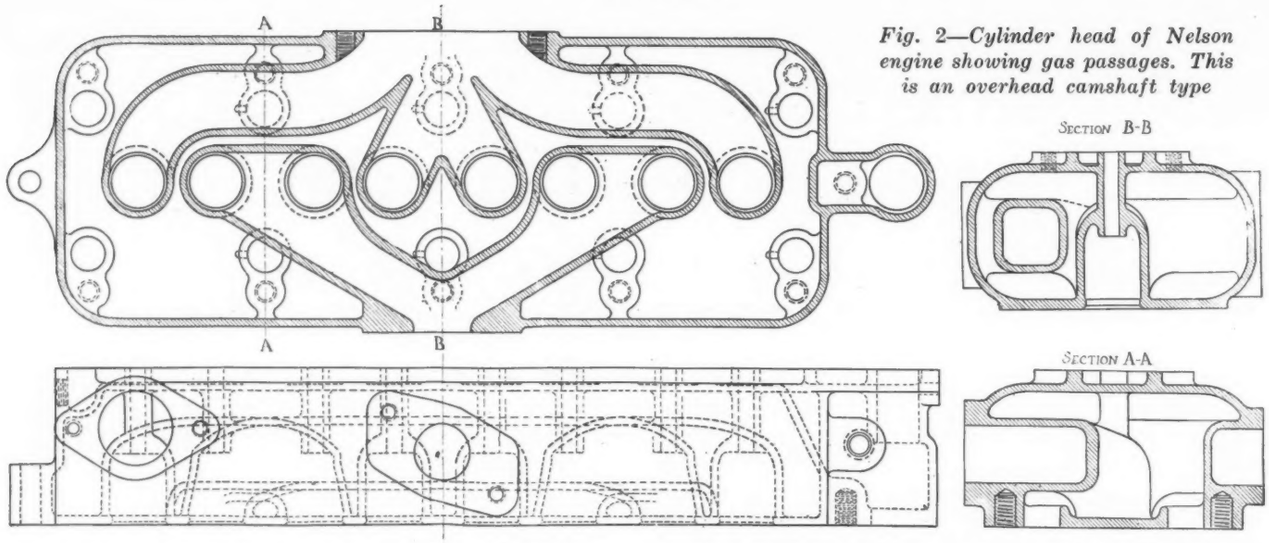


Fig. 2—Cylinder head of Nelson engine showing gas passages. This is an overhead camshaft type

output per cubic inch of piston displacement with an overhead valve engine than with an L-head. The L-head, however, has the advantage of being usually a better manufacturing proposition. From the standpoint of durability, there is very little in favor of either, with modern types of construction. As regards noise, the latest types of overhead valve, while possibly not so quiet as the best of the L-head, are sufficiently quiet not to be handicapped in this respect.

Taking the overhead valve engine as delivering the highest output per unit of combustion chamber volume, it may have its valves operated either by rocker arms or by an overhead camshaft. It is in respect to these methods of operation that some marked differences of opinion exist, and the writer wishes to quote two interested parties on this subject. One engineer states: "I do not think that the overhead camshaft will ever become the most used construction, for the following reason: If the camshaft is placed over the motor either a train of spur gears up the front of the motor or a double set of bevel gears with a vertical shaft drive is required. After the drive has been properly designed and worked out, it is very necessary that this shaft and all its working parts be oiled. This requires, in turn, that a special line be run up to the top of the engine, and it generally calls for a hollow camshaft made from tubing which is much more expensive to buy than ordinary camshaft material.

"It is also necessary to cover this shaft to keep the dirt and dust from the operating parts. Taking everything into consideration, it is not a quantity production proposition and its use, therefore, must be confined to relatively high-priced cars. I do think that cylinders with overhead valves, with the camshaft in the crankcase operating the valves through overhead rocker arms will, in time, replace the L-head. This arrangement will give nearly ideal conditions, allowing a more uniform compression chamber and giving higher output than is possible with an L-head. This last-mentioned type cannot be made to operate as quietly as an L-head;

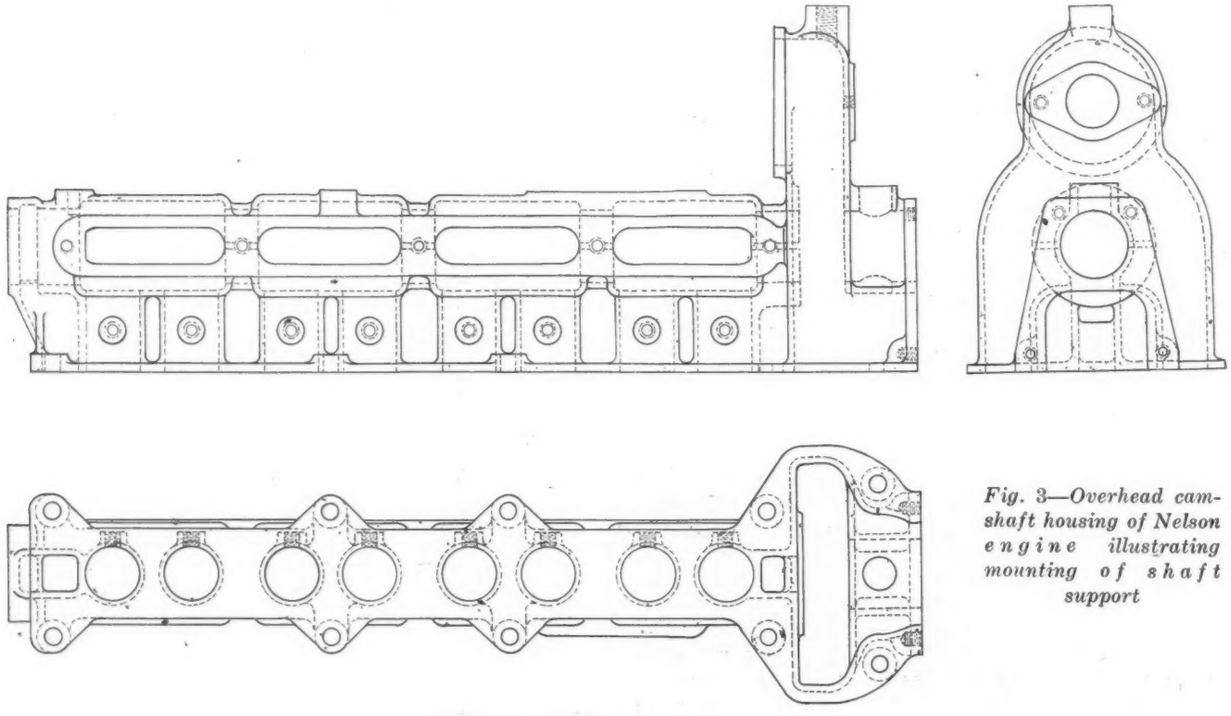


Fig. 3—Overhead camshaft housing of Nelson engine illustrating mounting of shaft support

nevertheless, there does not seem to be any objection to the additional noise."

Directly opposed is the statement of an engineer who has been developing an overhead camshaft engine during the last 5 years. He assigns seven reasons for its use:

1. It is more efficient.
2. It develops more horsepower for a given combustion chamber space.
3. It produces more complete combustion of low-grade fuels.
4. It has lighter valve operating parts.
5. It has only one point of lost motion in valve mechanism instead of three or four.
6. It insures durability because the parts are easily lubricated and absolutely enclosed.
7. It is lighter.

It will be noted that what one of the engineers calls a disadvantage is referred to by the other as an advantage, this being the enclosing and lubrication of the parts.

For low-priced engines and for truck use it would be difficult to surpass the L-head type of construction, from a commercial standpoint. With this engine the front end can be made very quiet, it develops at least 95 per cent of the power of an overhead valve engine within the speed ranges most used, and at present it is certainly cheaper to build.

Other Than L-Head Type Considered

This may not always be the case, however, and even now some of the best known companies in the passenger car business are considering the manufacture of truck engines of a type other than the L-head. One concern is working on an engine with an overhead camshaft for a 2-ton truck unit, and a prominent consulting engineering firm of Detroit has on its boards a truck engine with overhead valves driven by an overhead camshaft.

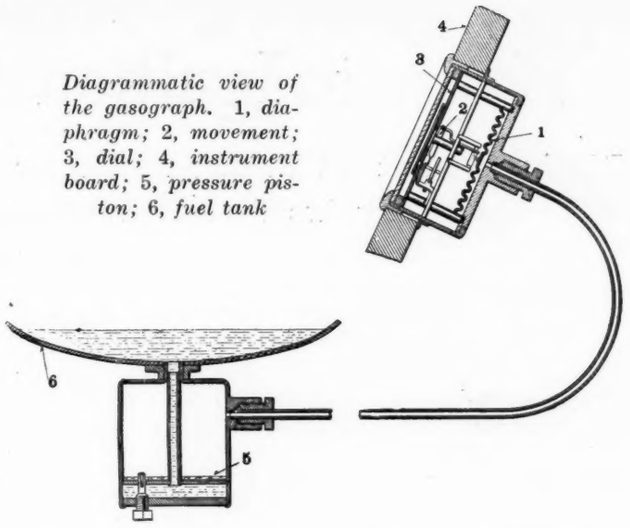
It will thus be readily seen that the necessity for improvement in thermal results has led to considerable mechanical work and may eventually lead to a change in practice in the valve drive, as well as in the combustion chamber itself. The most recently announced car—the four-cylinder Essex—has the intake valves in the head and the exhaust valves in the side. By separating the valves in this way and taking them out of line, it is possible to make the intake valves over 2 in. in diameter, thus securing high volumetric efficiency at high engine speeds.

With the overhead intake valve, by the use of a short carbureter connection and by allowing the gases to enter the cylinder in a downward direction, it is possible to work out an engine that will readily start even with the relatively low gas velocity at cranking speeds. This consideration increases in importance as time goes on and must be met by some skillful arrangement of the gas passages, or by the application of heat to the charge previous to its entrance into the combustion chamber. This heat is generally produced electrically, for one reason, because the use of flame is excluded.

—

The Gasograph Dash Fuel Gage

A TANK gage designed to be mounted on the instrument board and adapted to indicate the amount of fuel either in a seat tank or a rear tank is being placed on the market by the New Standard Adding Machine Co., St. Louis, Mo. The device contains no float, springs or wires, and it is not necessary to mutilate the tank in order to install it, as it screws into the drain opening. The principle of the device is as follows: The pressure due to the weight of the gasoline in the tank is transmitted through a small copper tube to the gage on the instrument board, and this indicates the quantity of gasoline in the tank by an indicating hand moving over the dial. The principle on which the gage works is the same as that of a pressure gage or manometer, except that a diaphragm is used instead of a Bourdon tube. The instrument can be installed with tanks located anywhere on the car and using either vacuum or gravity feed. It is guaranteed for 1 year. The retail price is $5 for cars having the tank under the seat and $6 for cars having the tank in the rear.



Diagrammatic view of the gasograph. 1, diaphragm; 2, movement; 3, dial; 4, instrument board; 5, pressure piston; 6, fuel tank

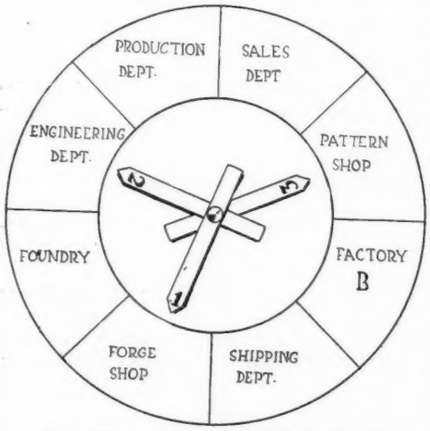
—

Locating Officials in a Plant

THERE are always some men in a factory who spend about half their time in the office and the rest in the plant. Often it is necessary to locate one of these men, and a simple means of doing it is to construct what might be called a Whereabouts Clock out of cardboard. Circles are drawn on the cardboard and the annular space thus enclosed is marked off into sectors. In each space is placed the name of a department to which the man in question is likely to go. Of course, it may not be possible to list them all, but most of them may be taken care of. Then three arrows are fashioned, numbered 1, 2 and 3, and are pivoted with a thumb tack at the center.

If he is going to one place only, say the Production Dept., and coming right back, then the three arrows are placed in line one under the other so that only No. 1 shows, this arrow being pointed to the Production Dept. segment. If he is also going to stop at some other department, arrow No. 2 would be pointed at the segment in question.

As drawn the clock indicates that he is going first to the Forge Shop, then to the Engineering Dept. and finally to the Pattern Shop.



The Whereabouts Clock is a simple and inexpensive means of locating people

Magneto Ignition for Farm Tractors*

Magnetos Must Be Installed So Their Vital Parts Are Accessible and Where They Are Protected Against Dirt and Excessive Heat—The Service Problem

By J. G. Zimmerman
Service Manager, Sumter Electrical Co.

THE tractor engine works near its rated load most of the time; consequently, all appliances and accessories are subjected to harder service than in the automobile. This means that such accessories must be mechanically well constructed and so made that proper attention may be given them in service. It also means that the appliances must be conveniently located and well protected. Not long ago, in my travels, I called on a tractor manufacturer who pointed out with pride how he had succeeded in making a fully inclosed engine and gearbox. As a magneto man I could not fail to note that the only part of his equipment which was not protected was the magneto. It was placed where a single accidental blow could readily put the entire outfit out of commission and where dust and dirt could collect in quantity. I am pleased, however, to say that the particular tractor now is provided with better protection for the magneto, in accordance with suggestions made at the time.

While calling on a truck company, the engineer was anxious to know if our magneto would stand up on his engine. Upon examining the installation, I found the magneto chucked into a corner under the dash with the breaker end toward the rear. It was almost impossible to get one's hand through the available space to get at the breaker box, and absolutely impossible to adjust anything without first completely removing the magneto itself. Such an installation results in poor service.

A similar case is that of a tractor which has the magneto placed where it is impossible to get at it if the engine is hot and things go wrong. One has to put his arm through a loop in the exhaust pipe to touch the magneto, which is also exposed to great heat.

An Example of Faulty Wiring

One tractor observed had a very faulty wiring system. The spark plugs were so placed that one preferred to wait until the engine was cold before touching anything. One of these four-cylinder tractors was in use at a tractor school and was running on three cylinders. The students and instructors let it run on three rather than repair the plug fault. As there were ten or more makes of tractors in use, the showing made for this particular make was poor.

In another instance worthy of notice the high-tension wire used by the manufacturer was sent out made up in harness or of proper lengths to suit the installation, by the magneto manufacturer. The party who applied the same used the shortest cable for the longest reach and the longest for the shortest, with the result that the short cables rested lightly on one cylinder head, while the rest fell loosely over the engine. There were two instances of this particular method of wiring, both on the same make of tractor, at a show.

Now, the above illustrations show that either the engineers putting out the equipment do not realize the importance of proper installation, or they are negligent. At any rate, the need of calling attention to the faults and their remedies is timely.

Requirements of Ignition

Let us consider the engine charge and its ignition. Much has been said but relatively little done to prove up facts as regards what constitutes good ignition. I cannot conceive of a charge of gasoline and air at a given temperature and pressure requiring more heat or a higher voltage or any different spark for a small engine than for a large engine. It appears to me that, the gas charges being identical, except as to volume, the same spark will ignite either charge with equal facility. In other words, the spark for a given charge must be sufficient and afford a good factor of safety. By sufficient is meant of proper voltage and of proper heat value.

The timing of an ignition system is a matter of a small fraction of a second. Thus a 1200 r.p.m. engine, taking 0.050 sec. per revolution, will lose about 70 per cent of its power if the ignition is 0.001 sec. late. The modern magneto furnishes a spark of great accuracy. All magnetos are tested at the factory for accuracy and it is interesting to note that one seldom sees a variation of ½ deg. Battery systems with small timer cams often vary materially, and therefore show less accuracy than magnetos.

Wiring

The wiring of any ignition system has a great deal to do with its performance. Poor wiring can disable the best source of ignition so far as results are concerned. A case in hand was found at a marine motor company's plant. Here the magneto was O. K. but part of the wiring was run through a metal tube for 4 ft. or more, while the rest was not run through tubing. The tube being grounded and the wire being located inside of it, caused a loss of energy, sufficient to make the sparks fail or occur late. The loss of energy may be readily demonstrated by running a wire through a tube held in one's hand while standing on the ground. A surge of current will pass to ground through the body due to static induction alone.

When two conductors are parallel or near to each other, separated by air or some material like glass, they form what is called a condenser. The larger the surfaces and the nearer they are together—short of actual contact—the greater the capacity of the condenser. Now, if we connect a charged wire to one of the conductors, the other becomes charged to the opposite polarity. Thus the high-tension wire charged with + or — electricity from the magneto and the grounded tube becomes oppositely charged. The larger the condenser the larger the charge it can take on at the same voltage, and

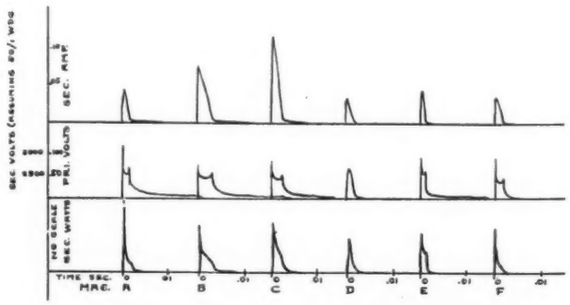


Fig. 1—Rough comparison of output wave forms of various types of magnetos run at 300 r.p.m.

*Read before the Midwest Section of the S. A. E.—Condensed.

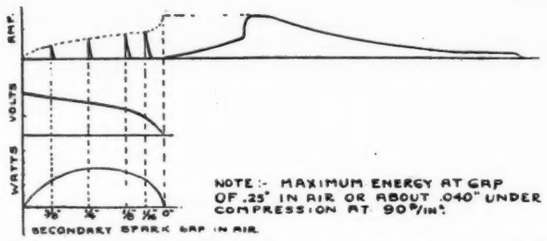

AMP.
VOLTS
WATTS
NOTE:- MAXIMUM ENERGY AT GAP OF .25" IN AIR OR ABOUT .040" UNDER COMPRESSION AT 90 P/IN².
SECONDARY SPARK GAP IN AIR.

Fig. 2—Secondary currents and volts with variable spark gap showing need of proper spark gap in plug to obtain best spark energy

also the longer it takes to charge it from a constant potential. If it has very large capacity and is charged from a source of limited capacity such as a magneto, the voltage will not rise to the maximum or high enough to break down the spark gap. It will then cause missing.

The energy of the spark is reduced in another manner, viz., by electro-magnetic induction. Whenever we alter the strength of magnetism within a conductor circuit, a current of electricity is generated therein. Thus the high-tension current when it jumps the gap of the plug passes through the iron tube which surrounds the wire cable and which is a closed conductor around the wire. The charge of current in the high-tension wire causes a change of magnetic flux about and in the tube, causing a generation of current and therefore a loss of energy. The static loss occurs before the spark, and the dynamic during the sparking. Both of these factors reduce the available spark energy and the static loss causes a late spark, because it takes more time to raise the voltage at the plug than if there were no loss.

The remedy is obvious—do not use metal tubes to worry the high-tension wires. Long wires take more time to charge than short wires, consequently the shortest possible wires should be used, all of equal length, between the ignition device and the plugs. Placing a wire close to the engine increases its capacity to absorb charge. Hence all wires should be kept at least ½ in. apart, instead of all being run in the same tube, even though it be non-metallic.

Spark Requirements

In order to understand the importance of the points just discussed, let us next consider the character of a spark. Inasmuch as the period of inflammation is very short, indeed, it must begin at a definite moment not subject to variation. In Fig. 1 we have a set of spark characteristics taken from several different makes of magnetos for rough comparison. Owing to the difficulty of measuring the voltage of high-tension sparks, we have taken advantage of the relation existing between the primary and secondary currents of the transformers. Then, if we measure the primary voltage and secondary current, we can by ratio of turns approximate the secondary circuit characteristics. Note that I say "appproximate," as one has no justification for drawing definite conclusions about anything unless positive proof is at hand. We hope, however, sooner or later, to be able to obtain the true secondary voltage characteristics, as we are working along this line and have some prospects of success.

Referring to Fig. 1, we see that all types of magnetos act about alike, the only difference being in the values of voltage and current. The watts calculated from the other data are not strictly comparable values, and though one magneto may appear to outclass another, it may not in actual performance, since no definite data are at hand as to winding ratios. The curves are only intended to illustrate the above mentioned facts.

The Initial Kick Voltage

Take particular notice of the first voltage kick of the primary, which corresponds well to that of the secondary. Coils of wire wound over the same core must of necessity develop the same voltage per turn. It is this initial kick that starts the spark going. Needless to say, anything which holds back this kick lowers the efficiency of the spark. Hence the effects on the spark of defects in the wiring scheme discussed above are apparent. Note that the voltage kick is almost instantaneous. Long cables, metal tubes for guiding same and cables near ground or near each other are all undesirable.

Energy of the Spark

Now, the initial voltage kick is not the whole spark nor the only factor controlling ignition. We must remember that ignition is effected by the heat of the spark, and the follow-up current of the spark accounts for much of the heat liberated. Hence, the spark must first have a good kick and then a proper follow-up current.

Considering again the time period for igniting the charge, this current must follow closely the breakdown voltage or kick voltage. If the spark has a certain total heat value or current-times value, it may or may not properly ignite the charge of gas. It depends upon the rate at which this energy is dissipated. Evidently, if the rate is high and the energy dissipated is sufficient to heat the surrounding gas to the igniting temperature, the ignition approaches an instantaneous character. The essentials, therefore, of a good spark are, first, a good kick voltage high enough to break down the spark gap, and then a rapid follow-up current of sufficient heat value to ignite the charge right on the heels of the breakdown of the gap.

Some magnetos have a lower kick voltage than others and a heavy protracted follow-up current. Such magnetos suffice for low compressions and low-grade fuels, but are poor "starters" at low speeds.

The "fat" spark of these magnetos is misleading to the eye. For example, some magnetos drag out the current for 30 deg. or more after the spark voltage breaks down the gap. Obviously this is too long.

Tests made with a four-cylinder engine running on kerosene showed that all magnetos now on the market met the requirements of good ignition. Fig. 2 shows test records from six makes of magnetos driven by the same camshaft. Each magneto was given its own best spark advance and in the tests no magneto produced an appreciable increase in engine output. Any magneto could be thrown in circuit at any moment so that during the test the fuel, carbureter, load, spark plugs, cables and water temperature all were identical. We could even remove one magnet from the Dixie magneto and still obtain the same engine output.

It was particularly noted on examining the timing that all systems fired with almost exactly the same advance. This shows that the first part of the spark did the work. Those magnetos delivering large or long-lasting sparks fired at the beginning before the whole spark was developed, proving that the follow-up was not necessary.

Magneto Make-and-Break Sparks

It must not be concluded from the above remarks that a small follow-up will always suffice. Where low-grade fuels are used, a longer lasting current will undoubtedly help to insure good ignition, though it may be a bit irregular. Hence, slow speed engines using fuel oil or low-grade kerosene are preferably ignited by a fatter spark. The make-and-break

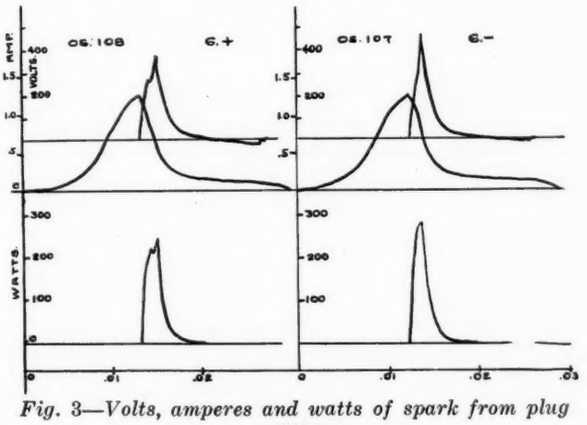
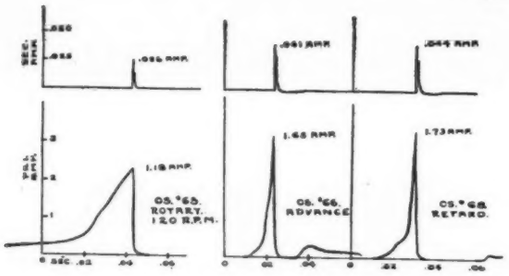
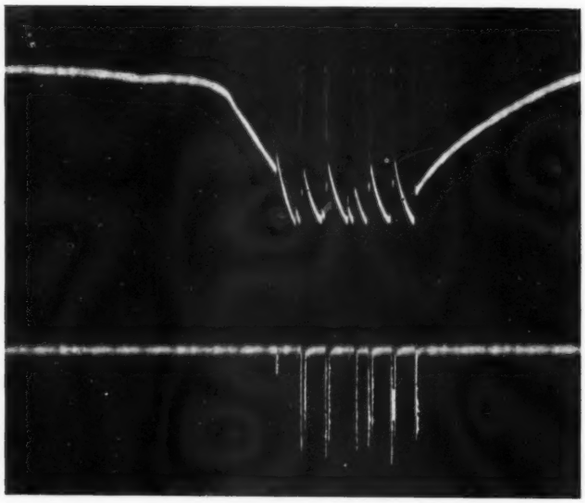


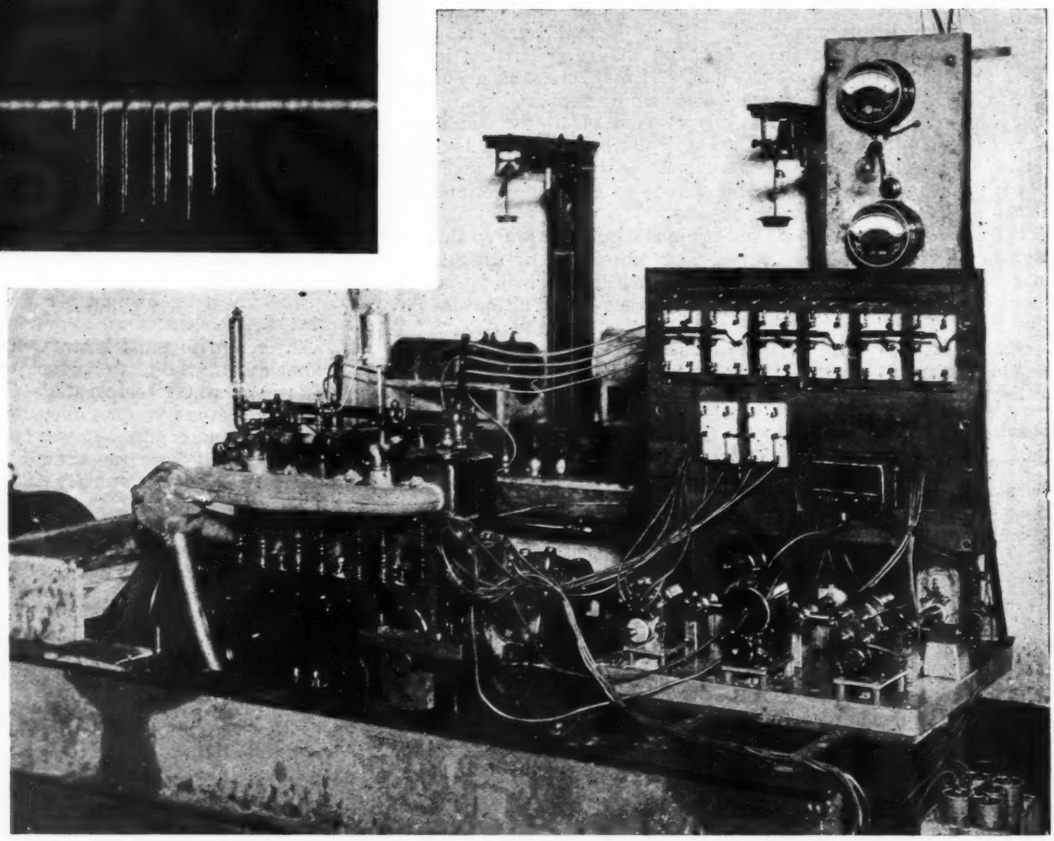
Fig. 3—Volts, amperes and watts of spark from plug oscillator





ignition system is here preferable for several reasons. First, the spark energy is greater than that of the high-tension spark, and fouling of a plug or igniter is less apt to occur. In the high-tension system, the voltage to which the insulation is subjected is from 2500 to 4000 volts or more, depending on the compression, temperature and spark gap, while in make-and-break oscillator systems it seldom exceeds 250 volts.

Reference to Fig. 3 shows the spark energy of a small oscillator combined with a make-and-break mechanism in one unit. The spark energy of this little magneto is much greater than that of the largest standard high-tension magneto in extensive use to-day. There is no reason why on slow speed tractor engines the make-and-break system should not prove equally or even more satisfactory than the high-tension system, now that we are forced to use low-grade fuels. With a plug oscillator the spark may be readily tested at any time, thus enabling the operator to determine whether the trouble is with the ignition system or elsewhere. The plug also can be very readily cleaned. It is quite possible, therefore, that low-tension ignition may gain in use on tractors when low-speed engines furnish the power. We have successfully run these plug oscillators at 1200 r.p.m., which is two to three times the normal speed and not practical for regular use.



Top — Fig. 5 — Magneto spark with and without impulse starter. Lower—Fig. 6— Action of impulse starter up to moment of throw-out. Right—Fig. 4—Method of using battery with magneto coil

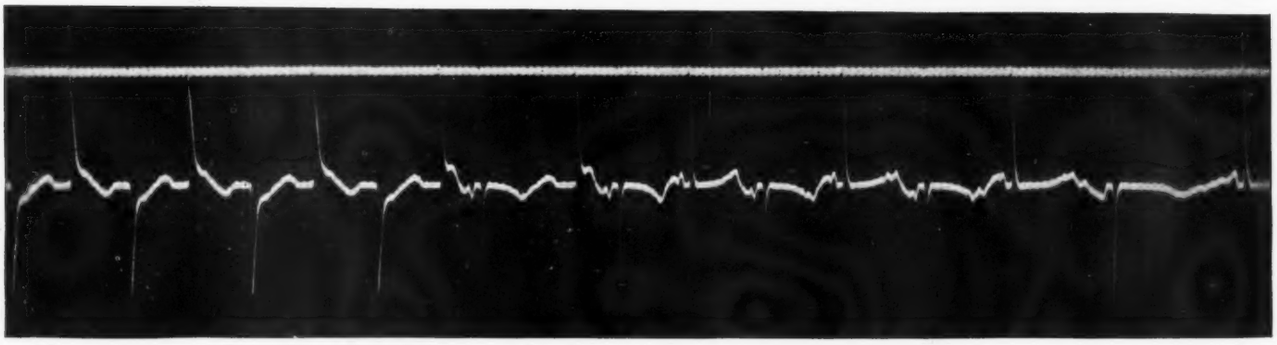


Fig. 7—Oscillographic record of magneto spark

It is well known that the magneto develops a weaker spark at lower speeds and that at very low speeds (below 50 r.p.m.) it is very difficult to start an engine on the magneto. As tractor engines are usually heavy and hard to crank, starting is very difficult without some means to help give a satisfactory starting spark. A battery and coil starting system involves complication.

Fig. 4 shows a system employing a battery with the magneto coil. The sparks are all satisfactory. The user has to remember one thing and that is to turn the switch over to straight magneto when the engine gets up to speed. Unless some extra automatic device is used with it, he usually forgets and finds that when he wants to start up the next time the battery is dead.

The Starter Coupling

The most satisfactory device now in practical use is the starter coupling. It is a simple mechanical self-contained automatic or semi-automatic attachment to a magneto by means of which the operator may crank his engine at any speed he desires after priming, and it will automatically deliver a fine spark. After the engine is under way, the device automatically cuts out and leaves the engine running on the magneto alone. The semi-automatic outfit is preferable, first, because it is seldom necessary to run a tractor engine below 100 r.p.m. and, second, for mechanical reasons, because the device is not suitable for continuous service.

Fig. 5 is shown to illustrate the advantage of the starter coupling over straight rotary action. With the magneto operated at 120 r.p.m. the spark energy is less than half that when the coupling operates. Any properly designed starter coupling retards the spark, no matter where the advance lever is located, hence the starter coupling insures greater safety to the operator. Fig. 6 illustrates the action of a starter coupling operating from start to throw out. Note the increasing velocity of the engine up to the speed at which throw-out occurs. Note also the secondary spark values.

Location of Magnetos

Quite a few tractor manufacturers place the magneto where it is not only inaccessible but also exposed to heat. It is to be remembered that high temperature, as a rule, impairs the insulating qualities of electric insulators. For this reason, and also on account of the difficulty of working on a magneto so located, a determined effort should be made to insure that the magneto and its location receive more attention in the future. The numerous complaints that come to magneto manufacturers are due to two things, viz., improper installation and lack of information on the part of the user.

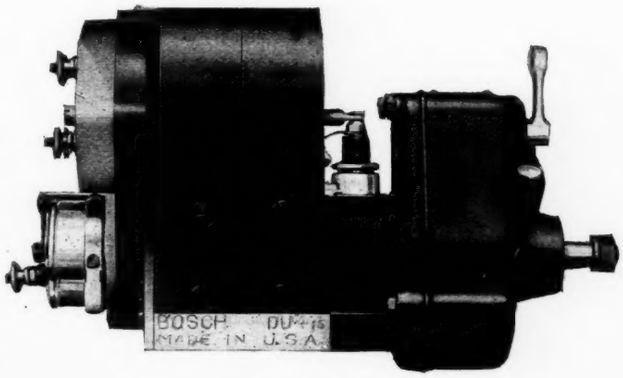
Service is a big factor in providing satisfactory tractor ignition; that is, *reasonable* service under direct factory supervision and so scattered throughout the whole territory that it is available to the user on reasonably short notice. This service should be real service, or it is worse than *none*.

Bosch Brings Out Impulse Starter

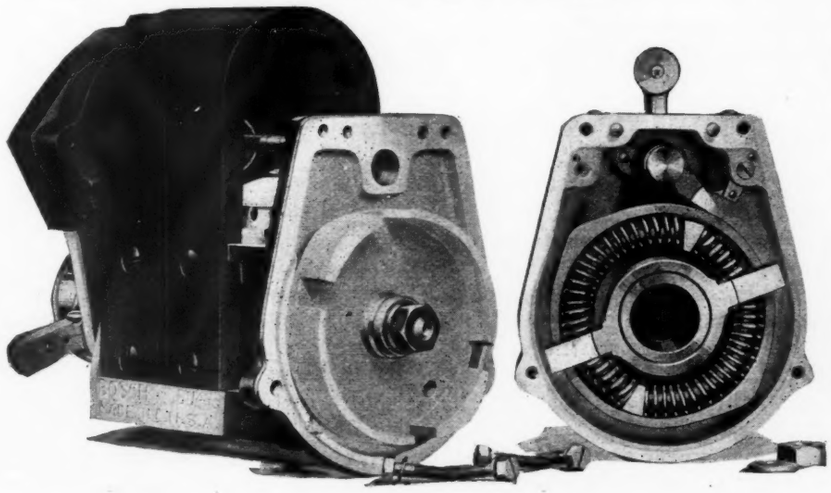
FOR motor truck and tractor ignition it is now customary to use magnetos without battery auxiliaries, and as the engines in general are so large that it is difficult to spin them, a so-called impulse starter aids greatly in starting the engine, especially in cold weather.

A magneto with impulse starter incorporated has just been brought out by the Bosch Magneto Co., New York. The starter is of the type making use of coiled springs. It is located between the magneto armature and the driving shaft. When the engine is cranked the armature is held stationary by means of a pawl while energy is being stored up by the compression of the springs. After tne driving shaft has been turned through a certain angle the pawl is released by a cam and the energy stored up in the springs imparts to the armature a quick rotary movement, resulting in the production of a hot spark.

When a speed of 120 r.p.m. is attained by the engine the impulse starter is automatically disengaged and the power is then transmitted through the springs of the starter to the magneto armature, the starter acting as a flexible coupling. It will be seen from the accompanying illustrations that the Bosch starter is of very rugged design. All of its working parts are made of steel, it is claimed to be well balanced and is completely inclosed in a dust-proof aluminum housing integral with the magneto itself. The heavier part of the starter is carried on its own sleeve bearing, hence there is no additional strain on the magneto bearings due to the starter.



Bosch magneto with impulse starter



Illustrating construction of impulse starter

In order to set the starter, a lever mounted on a shaft projecting from the starter housing at the front is moved to the operative position, either directly or through a suitable linkage. The starter is so constructed that if it should be accidentally engaged while the engine is running, it will not go into operation, and no damage will result either to it or to the magneto. The only attention said to be required by the starter is the supply of a few drops of oil every four or five weeks.

AUTOMOTIVE INDUSTRIES
THE AUTOMOBILE

PUBLISHED WEEKLY
Copyright 1918 by the Class Journal Co.

Vol. XXXVIII Thursday, May 23, 1918 No. 21

THE CLASS JOURNAL COMPANY
Horace M. Swetland, President
W. I. Ralph, Vice-President E. M. Corey, Treasurer
A. B. Swetland, General Manager
U. P. C. Building, 231-241 West 39th Street, New York City

BUSINESS DEPARTMENT
Harry Tipper, Manager

EDITORIAL
David Beecroft, Directing Editor
A. Ludlow Clayden P. M. Heldt
Sydney Oxberry
DETROIT OFFICE J. Edward Schipper
WASHINGTON OFFICE Allen Sinsheimer

BRANCH OFFICES
Chicago—Mallers Bldg., 59 East Madison St., Phone Randolph 6960
Detroit—95 Fort Street, West, Phone Main 1351
Cleveland—Guardian Bldg., Phone Main 1142.

Cable Address - - - - - - - - - - - - Autoland, New York
Long Distance Telephone - - - - - - - - - - - - 8760 Bryant, New York

SUBSCRIPTION RATES

United States and Mexico	One Year,	$3.00
Canada	One Year,	5.00
Foreign Countries	One Year,	6.00

To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order or Register your letter.

Owned by United Publishers Corporation, Address 243 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; W. H. Taylor, Treasurer; A. C. Pearson, Secretary.

Entered as second-class matter Jan. 2, 1903, at the post-office at New York, New York, under the Act of March 3, 1879.

Member of the Audit Bureau of Circulations.

Automotive Industries-The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

Manganese

IT appears that whatever restrictions may be placed on automobile production in the near future will depend on the amount of steel available after the needs of firms working wholly or partly on war orders have been met, and that steel production at present is limited by the available quantities of ferro-manganese. The manganiferous ore from which ferro-manganese is produced has to be brought from South America and shipping is lacking to increase the importation of this ore to the desired extent.

All steel used in automobile construction and for similar purposes contains manganese, which element is added to eliminate a defect in steel known as red-shortness, i.e., brittleness while in the red hot state. In the production of steel by the Bessemer process, air is blown through the molten iron ore to remove the impurities and toward the end of the "blow" the oxygen of the air begins to combine with the iron, burning it, which is the cause of red-shortness. This combination of the oxygen with the iron can be prevented by the addition of manganese, which is generally added in the form of an alloy of iron and manganese known as ferro-manganese, and it is the scarcity of this material and the ores from which it is produced in this country which is threatening the automobile industry.

All of the S. A. E. steel specifications call for a manganese content. It seems that the least amount of the element is called for in spring steels, viz., 0.20—0.45 per cent. The highest manganese content called for in the specifications is from 0.50 to 0.80 per cent. This is the percentage in all vanadium steels, while the chrome-nickel steels contain only one-half this amount. It would seem that a reduction in the amount of manganese would impair the qualities of the steel, especially if the steel has to be forged. Certain parts of automobiles, such as shafting, which do not have to be worked while at a red heat, might well be made of steel containing less manganese and if the shortage of ferro-manganese should grow more acute it may be necessary to revise the specifications of automobile materials, separating those which could be made of steel slightly red-short without any serious difficulty.

The Car Delivery Problem

AT the present time a large percentage of all motor trucks and passenger cars which are sold in the East must be delivered by the drive-away method. In the case of motor trucks the system cannot be considered wasteful, as the trucks can be employed to carry a load of merchandise from their point of departure to their destination, and as in many cases trucks are engaged in the transportation of merchandise between the sections of the country where the new truck is manufactured and sold respectively, it is quite possible to make the trip pay for itself. Not so in passenger car delivery. It is not feasible to carry a load of merchandise of any consequence in a passenger car, and the delivery of cars in this way is comparatively expensive.

We have seen pictures of cars loaded on trucks and delivered overland in that way. This practice has been followed for some time by concerns manufacturing both trucks and passenger cars, but recently the idea has been seized upon by others. In making long-distance truck haulage pay it is, of course, essential that the loads selected be of considerable value and that their prompt delivery warrant the payment of considerable transportation charges. This applies to the passenger automobile as it does to few other articles of manufacture. Moreover, both trucks and passenger cars often originate in factories located close together in the large manufacturing districts of the Middle West and are delivered to the big cities of the East. It is therefore quite logical that passenger car makers have adopted the practice of entering into agreement with truck manufacturers whereby every truck that leaves the factory carries a passenger car to market. Automobile manufacture just now is beset with difficulties of all kinds, but this plan carried out to its greatest possible extent seems to bid fair to go a long way to solve the car delivery problem in a rational way.

Tractor Resistance

DURING the early days of automobile development some interesting experimental work was done on road traction resistance under various conditions, and we well remember an International Automobile Congress paper in which much of the data obtained was summarized. Some of the experimenters, of course, had special objects in view, such as to determine whether a solid tire required more power than a pneumatic tire, but in a general way the object was to find a basis for calculating the power required to propel automobiles.

These investigations may have served their purpose at the time, but at present, when deciding on the horsepower to provide for a car of given weight, etc., it is not customary to go back to first principles. The basis of calculation generally employed is the number of pounds weight to be moved per horsepower or the piston displacement per 100 lb. The average figures obtained if the power of different cars is reduced to these bases is well known to automobile engineers, and they will provide more power if they want a particularly lively car and less if they want to keep the cost down.

One difficulty encountered in making use of the experimental values on road traction resistance was that of accurately defining the character of road surface. There is an enormous difference in the resistance encountered on smooth, level asphalt pavement and in deep sand. It seems reasonable to suppose that there is also a very great difference in the rolling resistance encountered by a tractor on a dry hard stubble field and on loose wet soil barely able to support the machine.

It appears from the ratings of agricultural tractors that about one-half of the total engine power is used in propelling the tractor itself and the rest is available at the drawbar. This looks like a rather low efficiency, and by a careful study of the effect of wheel diameter, specific loading and form of lugs, it may be possible to improve matters. There can be little doubt that the lugs generally used are the cause of serious power losses. Lugs, however, are necessary to secure the required grip on the ground. Some form of lug readily adjustable to the condition of the soil and the pull required would possess advantages. Under favorable conditions the lugs could be reduced or withdrawn to give almost a smooth wheel, and when more traction was required they would be forced out.

It will certainly be very interesting to note the results that will be obtained in the experiments on tractor rolling resistance conducted by Professor Moyer of the University of Minnesota, to which reference is made in the news columns of this issue, particularly as regards the effect of wheel diameter and specific loading on the resistance. In this connection it must be remembered, however, that there is a certain interdependence of the various elements in tractor design. For instance, if it were found that, all other conditions being equal, the rolling resistance decreases with an increase in wheel diameter, it would be questionable whether practical advantage could be taken of this discovery, for the reason that wheels of larger diameter would weigh more, making it necessary to lug around additional weight, and a higher gear reduction would have to be used which would slightly decrease the efficiency of transmission. Perhaps on account of these complex inter-relationships it will be necessary to develop tractor design also largely by cut-and-try methods, yet such knowledge as will result from an experimental investigation of the fundamental factors can only serve to clarify the problems in the mind of the designer.

Female Labor in Industries

GREAT progress is made in all of the warring industrial countries in the introduction of female labor in industries which previous to the war employed only male labor. At first the change-over was made in shops where the work is comparatively light and calls for no great physical exertion, but as the movement grew women were put at constantly heavier work, until there is now probably not one type of machine tool that is not successfully run by female labor, and instances have come to our notice where women are employed even as molders in iron foundries.

In connection with the change-over, some surprising things have occurred. Undoubtedly almost every employer in the heavier machinery industries, when first introducing female labor, did so with a certain reluctance. In fact, many were simply compelled to take the step because male help could not be obtained. Few expected really satisfactory results and the step was generally regarded as a last resort. It was, therefore, a most agreeable surprise to find that in many cases the woman machine operators turned out considerably more work than men working alongside of them. One manufacturer of gearing gave the increased output of female labor as 10 to 15 per cent.

The fact being established, the reasons for the better showing of female labor are not particularly difficult to find. Women entering this line of work realize that they are opening up a new field for their sex and are on probation, as it were. They know their work is being watched and compared with that of male employees, and they are eager to show up well in the comparison. On the other hand, the new male help which is being taken on in these same plants, and the output of which is made the basis of comparison, is far from being of the same standard as that obtained several years ago. They are often very young or of a class not readily trained to labor requiring a certain amount of skill.

Latest News of the

Necessity of Trained Workers

Old "Hiring and Firing" Methods Deprecated by Convention of Manufacturers

NEW YORK, May 22—The manufacturers of America were called upon at the convention of the National Assn. of Manufacturers, held this week at the Waldorf-Astoria, to put an end at once to the old policy of "hiring and firing."

In a report prepared by the Committee on Industrial Education and presented by H. E. Miles, the chairman, it was pointed out that the most potent influence in reducing the present huge economic waste due directly to excessive labor turnover is training, the development of skilled workers from untrained ones.

At the meeting, which was the twenty-third annual gathering of representative manufacturers of America, and which, owing to the present busy state of affairs, was somewhat lightly attended, the new problems of the manufacturer arising out of the changed conditions resulting from the war were the chief subjects of discussion.

The spirit of the convention was crystallized and expressed in the following resolution pledging to the Government the unqualified support of the country's manufacturers:

Resolved, That this association urge upon its members and upon members of all other associations, as well as all individuals interested in the success of the Allies' cause, that they prepare themselves for the struggle ahead by husbanding their available resources and conserving their energies that they may be able from time to time, for no matter how long, to respond in full measure to the calls of the government for money and service with which to carry the struggle to a victorious end.

Not a Matter of Wages

In his report, referred to above, Mr. Miles said, "Too often unemployment and turn-over are ascribed to low wages only, but turnover is often as great where wages are the highest in the world. In one such factory, where airplane engines are made, it is 10 per cent per week, and this is not unusual. Training stops this. In another high-grade factory turnover was 200 per cent. By improved general conditions it was reduced to 50 per cent, and among those trained to 3 per cent."

The experience of European and particularly British manufacturers when they were forced to turn to unskilled labor as a result of increased demand and the reduction of the skilled supply, through the voluntary enlistment system then in vogue, was referred to in the report, and the fact was emphasized that to-day, among both British and French manufacturers the production of skilled mechanics by systematic training is recognized as an obligation resting upon them.

Buffalo has decided to introduce this training in eight or ten of her principal factories. About March 1 the Curtiss Airplane Company, in distress for highly efficient workers, started a training room in a balcony 50 by 600 ft. After six weeks it was transferring from this training room to the factory 30 workers daily, with an immediate betterment in production throughout the factory. In cable splicing, girls after four days' training were doing the best work the Government inspector ever saw, and averaging 55 against 40 in the shop. Another operation took 48 minutes in the training room against 60 in the shop. There is no question there now as to labor supply and production.

Rochester Interested in Work

Rochester is training as a community matter so that its factories will neither prey upon one another nor upon neighboring cities. One picked operative from each of six of her factories is at this writing in the training room of the Dayton Recording & Computing Machine Co.

After three to five days of observation and practice there these men will actually instruct some of the Dayton company's entirely new workers in machining the extremely accurate parts of optical sights for battleships. At the end of ten days to two weeks they will return to Rochester and open training rooms in their several plants.

A group of New Jersey manufacturers have secured an expert to install training in their plants. The Wright-Martin Aircraft Corporation is training in New Brunswick and the Snead & Co. Iron Works in Jersey City. The Standard Aircraft Company of Elizabeth is preparing to train, and also the Worthington Pump Company.

How the Training Should Be Done

On the making of skilled men out of untrained ones the report asserts that the instructional work should be a part of the shop system; the matter upon which instruction is given should be part of the factory job, and so far as possible should enter into factory production. This training will make operators in one or more processes, capable of getting production, not skilled tradesmen.

Use Inch Tire Sizes for Export

Car and Tire Makers Agree on Use of Standardized Sizes and Styles

NEW YORK, May 22—Commencing July 1, 1918, manufacturers of passenger automobiles will use inch sizes in equipping cars for export, instead of the usual metric sizes. Following the promulgation of a list of standard sizes by the Commercial Economy Board of the Council of National Defense and its formal approval by the tire makers and the car producers, the tire makers met with the Export Committee of the National Automobile Chamber of Commerce last week and agreed to substitute the inch sizes for metric sizes.

The tire manufacturers have agreed to carry in stock in all countries sufficient stocks of tires to fill requirements. Car makers are to supply the tire people with estimates of the number of cars likely to be exported to the various countries during the year beginning July 1. The tire makers in turn will prepare lists of foreign branches and dealers where stocks of standard size tires will be maintained.

—

Catalogue Sizes Standardized

CHICAGO, May 23—The Catalogue Conference of the National Assn. of Purchasing Agents passed a resolution yesterday recommending 3 sizes for manufacturers' catalogues. These are 6 x 9 in., 7½ x 10⅝ and 8 x 11. The stock recommended was 40, 45, 50, 60, 70 and 80 lbs. on a 75 x 38 sheet basis. These weights give printers a chance to use accumulated stock. The colors recommended are white and natural.

The recommendations have already been accepted by representatives of the National Gas Enginemen's Assn., the American Institute of Architects and others. Makers of filing cabinets say they will make their products to fit the catalogues, if necessary.

—

Wahlberg in Motor Equipment Division

WASHINGTON, May 22—Eric Wahlberg, chief engineer of the Nash Motors Co., Kenosha, Wis., reached Washington to-day to assume a commission as major in the Ordnance Department. Mr. Wahlberg will deal with engineering and designing of army trucks under Col. Moody of the Motor Equipment Division of the Ordnance Department.

Automotive Industries

Horning Will Leave Automotive Section

Pressing Need for His Services At Home—Working on New Discovery to Help Win the War

WASHINGTON, D. C., May 23—H. L. Horning, director of Automotive Products Section of the War Industries Board, Council of National Defense, has resigned. His resignation has been accepted for the War Industries Board, by George M. Peek, Director of Finished Products. Mr. Horning is secretary of the Waukesha Motor Co., Waukesha, Wis., which has increased its business from $375,000 in 1914 to $7,500,000 in 1918, and this has caused imperative need for his services at home. He has been urged for some time to resign and give his entire time to his personal business affairs.

Mr. Horning came to Washington in May, 1917, as a member of the Production Automobile Committee of the Council. He has been actively interested in the design and production of standardized war trucks against which serious opposition developed through objection to this program on the part of certain inerests.

In July, 1917, he was made Chairman of the Automotive Committee, and has held that position ever since. His duties have been the final supervision of purchases by the Allies and the United States government of all automotive products, including passenger cars, motorcycles, motorcycle side-cars, motor ambulances, trucks, truck bodies, truck trailers, armored cars, military tractors, military tanks, airplane engines, gas engines, stationary gas engines and automotive accessories.

It is reported that Mr. Horning is working on a new discovery to aid in winning the war and that much of his time will be given to that work in the Waukesha laboratories.

Following are the letters of resignation and acceptance:

Mr. Geo. M. Peek, Commissioner, Finished Products.

Dear Sir:

Believing that I could remain away from my factory for some time, and out of courtesy to Mr. Baruch, who at that time was just appointed chairman of the War Industries Board, I withdrew my resignaeion which I had wired to Mr. Brookings.

The time has come when my company feels that I should return. The facts are that I have been the Managing Director ever since I organized the company. I round out a year's absence here on June 1. My assistant is in Pershing's office and his chief aide is at Camp Dodge. The company has doubled its output notwithstanding this, but problems are piling up which need prompt handling.

I feel that yau can appreciate that I would like nothing beter than to stick it out until the end of the war, but I feel that the growing control of the War Industries Board demands that its section chiefs must be prepared to give all their time undivided to the work in hand. This is absolutely necessary in order to keep up with the rapidly developing reorganizations which are going on.

I therefore respectfully request that I be relieved at the earliest possible moment, holding myself available until a new chief can fill my place.

Respectfully yours,
H. L. HORNING,
Chief Automotive Products Section.

Mr. H. L. Horning.

My dear Mr. Horning:

Your letter of the 22nd inst., is at hand in which you ask acceptance of your resignation, which was tendered some time ago and explaining the reason therefor.

It is a matter of great regret that you feel it necessary to take this step, but I think I can appreciate the situation and no doubt you have an obligation at home which you cannot totally disregard.

I concur with you that things are developing in a way here which means that section chiefs must devote all of their time to the work in hand.

On behalf of Mr. Baruch as well as myself, I desire to express my sincere and genuine appreciation of your unselfish services. I note that you will remain on the job until we can find someone to take your place and your action in this respect is much appreciated.

With cordial regards,
GEO. M. PEEK,
Director of Finished Products.

—

Officials To Help Investigation

WASHINGTON, May 22—Officials against whom charges have been filed in connection with airplane production are not to be placed in the position of investigating the charges made against the airplane program. This relates specificarry to Cols. E. A. Deeds, R. L. Montgomery and S. W. Waldron who were detached from their regular duties to cooperate with the Department of Justice earlier this week by Secreary of War Newton D. Baker, and is made clear by a statement given out of Attorney General Gregory which is as follows:

"On being asked in what way Cols. Edward A. Deeds, R. L. Montgomery and S. W. Waldron of the Signal Corps, who were yesterday ordered to report to him would co-operate and assist in the pending aircraft investigation, the Attorney General replied.:

"We will seek and obtain full information with respect to all transactions in connection with aircraft production, but it must be distinctly understood that no person concerned in any transaction under inquiry will be permitted to have any part in the conduct on the investigation."

Car Tax Conference Scheduled

Difference of Opinion on Taxation of Cars Held by Branches and Retailers

WASHINGTON, May 22—The National Automobile Chamber of Commerce will hold a meeting with Treasury Officials Friday, May 24, regarding various automobile taxes. Alfred Reeves, general manager of the N. A. A. C., Robert A. Branningan and Charles Thaddeus Terry, attornies, will represent the automobile industry.

The most important question is the 3 per cent tax as applied to retail branches of manufacturers. The Treasury Department maintains that the manufacturer selling a car at retail, for example at $1,000, must pay 3 per cent on that $1,000 or $30 whereas the manufacturer selling that car to a dealer to be in turn sold at retail must pay his 3 per cent tax only on the price to the dealer which will for example be $800, making the difference in tax payment in this instance of $6 per thousand.

Another tax problem which will come up at this hearing relates to the question "does ownership of automobiles change when the shipment is delivered to the carrier by the manufacturer and the bill of lading and draft is sent through the bank for collection?" This question arises with regard to the status of passenger cars shipped prior to Oct. 4 with sight draft against the bill of lading. The Treasury Officials maintain that where the draft was not lifted until after Oct. 4, these passenger cars are subject to the 3 per cent tax and not the 1½ per cent tax which the National Automobile Chamber of Commerce contends is the correct tax.

The controversy over these tax questions has been of long duration. On the problem of those shipments before Oct. 4, the Treasury Department has been collecting double tax, the 1½ per cent tax and the 3 per cent tax. After the controversy is settled there will be a rebate according to the decisions.

—

2473 Class B Trucks Produced

WASHINGTON, May 22—Two thousand four hundred and seventy-three class B trucks have been produced to date. This makes 25 per cent of the total number of 10,000 in the original order for the standardized heavy duty war trucks. Production is now at the rate of more than 70 per day and the prospects are that the complete schedule will be met by August 1.

Must Furnish Import License Number

No Invoices Will Be Consulated Unless Shipper Provides Consul With This

WASHINGTON, May 20—On and after May 27, 1918, no consular invoices for any commodity are to be consulated unless the shipper provides the consul with the number of the United States import license covering the shipment, according to a new ruling by the War Trade Board. The only exception to this rule is the case of shipments covered by general import licenses.

It is now necessary for importers to communicate to their shippers abroad the number of the United States import license for articles on the restricted lists before consular invoices can be obtained and shipments started from abroad. The present ruling extends this regulation to all articles, both restricted and unrestricted, except such as are covered by general import licenses.

This means that import licenses must be obtained for the importation of all commodities before they leave foreign points. It is believed that this will avoid much uncertainty in the minds of both importers here and consular agents abroad as to what import license numbers must be communicated abroad. It will also give the War Trade Board an opportunity of passing upon all importations from a standpoint of enemy trade connection before shipments are put in transit.

The Bureau of Imports will pass promptly on all applications for import licenses, so that, if the license is granted, the importer may be informed immediately of his license number and send it by mail or cable to his shipper abroad.

As intimated above, certain classes of importations are permitted to enter under general import licenses; and where these licenses exist it is unnecessary for importers to apply for individual import licenses. These general licenses are designated as "PBF Licenses." The principal ones now in effect are the following:

(1) Covering the importation of all commodities not on the Restricted Lists, where the value does not exceed one hundred dollars ($100).

(2) Covering all importations into Alaska, Canal Zone, Philippine Islands, Hawaii, Guam, Tutuila, Porto Rico, Virgin Islands, when they are for consumption in those countries and not for trans-shipment.

(3) Covering the importation of all commodities from Canada and Newfoundland except those mentioned in the President's Import Proclamation of November 28, 1917. Where such commodities are on the Restricted Lists, this general license covers them only when shipped by rail or lake, and when they originate in Canada or Newfoundland or in a country from which they would be licenses for importation directly.

(4) Covering the importation of goods previously exported from the United States, when the value thereof does not exceed five hundred dollars ($500).

(6) Covering importations of all empty drums, cylinders and containers, American owned, which have been used in the exportation of commodities from the United States.

Consuls abroad have been informed of the existence of these general import licenses, and they will certify consular invoices for shipments coming under them without requiring the number of the individual import license.

—

Pierce-Arrow Earnings at Rate of $16

BUFFALO, N. Y., May 21—The Pierce-Arrow Motor Car Co. earned net profits of $1,231,867 in the first quarter of 1918, which, if continued in the same proportion during the entire year, will approximate $5,000,000. After deduction of preferred dividends, the balance of profit was equal to $4.12 for the quarter, as compared with $11 a share for 1917.

In official circles, however, this rate of net is not expected to continue during the entire year. Directors will be satisfied if the final accounting shows earnings equal to those of 1917, when the amount applicable to dividends was $3,598,748.

The production program of the company follows:

First half of 1918: 500 passenger cars (orders carried from last year).
Last half of 1918: 1,000 passenger cars (1918 orders).
1918: 5,000 trucks.

In 1917 the production of passenger cars was 2600 and the truck output 5000. The company at present has more than $15,000,000 of orders on its books.

The net income account for the 3 months ended March 31, 1918, follows:

Operating profit	$2,326,552
Depreciation, war taxes and interest	1,094,685
Net profit	$1,231,867
Preferred dividends	200,000
Common dividends	312,500
Surplus	$719,367

—

To Sell Commandeered Nickel

WASHINGTON, May 19—President Wilson has authorized the Alien Property Custodian to sell 279,252 lb. of nickel at private sale without public or other advertisement. The sale will be held at Tompkinsville, Staten Island, New York, where the nickel is now stored with the American Dock Co. This nickel was the property of Hammar & Co., Germany, and was taken over by the Alien Property Custodian.

—

Martin Acquires More Land

CLEVELAND, May 16—The Glenn L. Martin Co. has just purchased an additional parcel of land approximating 13 acres adjoining its large factory tract. This, with the 57 acres acquired several months ago, gives the company about 75 acres. The new land gives an additional 1100 ft. of railroad frontage and a sweep of about ½ mile along the Nickel Plate, which will be used as a flying field.

Committee Named to Investigate Steel

Manufacturers and Officials Included—To Determine If There Is a Shortage

WASHINGTON, May 21—A joint committee was appointed May 17, comprising steel manufacturers and government officials, to investigate steel conditions and to determine whether there is a shortage of steel. Threats of drastic government action, including suggestions for control of steel by the War Industries Board, were met by members of the steel industry with expressions of confidence in the ability of the industry to meet all government requirements during the next year.

There is a sharp conflict of views between the steel makers and government officials. Bernard M. Baruch, chairman of the War Industries Board, and J. L. Replogle, director of steel products, claim that the government steel needs are so great that a material expansion of steel plants and curtailment of steel shipments to less vital industries are necessary to prevent a crisis.

Members of the steel industry are optimistic and inclined to the belief that they can provide the necessary steel for the government and still meet the more essential industrial demands. Differences of opinion arose in yesterday's meeting as to the actual steel needs of the government, the steel men asking that they learn the exact facts as to war needs. They said that if they had an actual budget means could be found to meet the requirements.

The War Industries Board estimates that sufficient steel to construct 12,000,000 tons of new shipping must be produced for the Shipping Board alone next year. The War and Navy Department demands will be much heavier than was expected, according to the government officials.

Mr. Baruch, it is stated, will bring the matter to the attention of President Wilson at the war cabinet meeting to-morrow, when the problem will be thrashed out.

The joint committee appointed yesterday to agree on steps to increase steel production and restrict non-war consumption includes J. A. Farrell, president of the United States Steel Corp.; Eugene G. Grace, president of the Bethlehem Steel Co.; H. G. Dalton, Pickands, Mather & Co.; J. A. Topping, chairman of the Republic Iron & Steel Co.; E. A. S. Clarke, president of the Lackawanna Steel Co., for the steel trade, and Alexander Legge, J. L. Replogle and Brig.-Gen. Hugh L. Johnson for the government.

At this meeting it was learned that many of the smaller producers are unable to operate their plants at the present government price of $65 a ton for steel. The conference to-day discussed incidentally the proposed curtailment of

the automobile and piano industries, and the official view favored a heavy cut. The piano industry is said to have several hundred million dollars' worth of notes outstanding, and if the industry were suddenly suspended considerable financial disturbance would result.

Mr. Replogle, although without a definite budget of government needs, maintained that there was a critical shortage in steel and pig iron. Reports from the steel districts show that during the last week there has been a large increase in the steel and pig iron output. Increasing coke supplies have aided the blast furnaces. Production in pig iron now is at the rate of 40,000,000 gross tons per year, the best rate in eleven months and a substantial gain over the average of the last 2 years.

Many steel companies are now operating their blast furnaces advantageously, and further increase in total production is expected through the blowing in of furnaces that have been idle for many months.

Steel Production 3,000,000 Tons Monthly

Last week the Carnegie company blew in 2 additional furnaces and is operating 53 out of its total of 59. The company's pig iron production is now at 94 per cent of the capacity.

Finished and semi-finished steel production is now running close to 3,000,000 tons a month, which quantity is expected to be greater than government demands for any considerable length of time, and it is expected that by July 1 some non-war industries will be able to obtain supplies of finished steel in good quantities. Steel ingot production is now at the rate of more than 43,000,000 tons a year, a considerable increase over March.

The iron and steel industries are said to have gone on a 100 per cent production for war materials during the past week, turning down orders from the non-war industries. It is expected that this plan followed for 60 to 90 days will result in a supply of steel sufficiently large to meet all government demands so that a percentage can again be given to other industries.

—

Fickling Enameling Reorganized

LONG ISLAND CITY, N. Y., May 21—The Fickling Enameling Co. has passed out of existence and has been succeeded by the Enameling & Stamping Corp., organized with a capital of $200,000. W. Irvine Fickling will be president of the new company, and H. F. Holbrook, formerly associated with the Holbrook company, manufacturer of bodies, will be secretary and treasurer.

—

Winton Discontinues Milwaukee Branch

MILWAUKEE, WIS., May 20—The Winton Co., Cleveland, has discontinued its branch here. The Winton line will be distributed by the Osmond Motor Car Co., state distributer of the Chalmers. The Osmond company has moved into the former Winton branch house quarters.

Foreign Trade Mart Established

New York Permanent Exposition to Provide Meeting Place for Makers and Foreign Buyers

NEW YORK, May 20—For the purpose of providing the manufacturers of the United States with a market place where they may meet the foreign buyers who are coming to New York from all parts of the world, the New York International Exposition of Science, Arts and Industries now is being constructed here, and will be opened to the public May 30.

The exposition is to be a permanent affair, along the lines of Shephard's Bush, London, and the annual trade conference at Lyons, France. The exposition season each year will be from May 30 to Nov. 1.

The exposition grounds are 27 acres in extent, and are located at the East 177th Street subway station and the Bronx River, one of the most accessible points of Greater New York, with good transportation facilities.

There are 5,000,000 people within a 5-cent fare ride and transportation equipment to handle 100,000 people an hour. There are 5,000,000 more people within a 25-cent ride of the exposition grounds.

The exhibit buildings now under construction include a Palace of American Achievements, Palace of Fine Arts, Liberal Arts and Varied Industries and other features found at previous world's expositions.

The exhibit is part of America's effort in the foreign trade competition after the war.

When the world war started Germany controlled about 60 per cent of the South and Central American trade. The manufacturers of the United States divided about 13 per cent among them. According to the statistics of the Merchants' Association of New York there were comparatively few foreign buyers in this market at that time. During the past year, according to the same reliable authority, more than 60,000 foreign buyers were registered in New York City, and our trade with Cuba alone leaped to an excess of $400,000,000. What is true of Cuba is true also, in proportion, of all Central and South American countries.

—

Addition for Cleveland Pneumatic Tool

CLEVELAND, May 18—The Cleveland Pneumatic Tool Co. will erect a 1-story addition to its plant as a machine shop.

—

Independent Harvester Elects Officers

MILWAUKEE, WIS., May 20—The Independent Harvester Co., Ltd., organized as a successor to the Independent Harvester Co. of Plano, Ill., has elected these officers: President, Lawrence Fitch, president of the Western Malleables Co., Beaver Dam, Wis., and treasurer of the Globe Seamless Steel Tubes Co., Milwaukee; vice-president, A. J. Earling, president of the board of directors of the Chicago, Milwaukee & St. Paul Railway Co.; secretary, A. W. Wilbrand, secretary of the Western Malleables Co.; treasurer, Grand Fitch, vice-president of the National Exchange Bank, Milwaukee. The capital stock of the new company is $3,500,000. The plant in Plano, which has been in the hands of a receiver since last December, has been taken over, and production will be continued on an increased scale.

—

Elkhart Gets Government Contract

ELKHART, IND., May 21—The Elkhart Carriage & Motor Car Co. has received a government contract for several thousand ambulance bodies. The contract does not mean the discontinuance of the company's automobile business. Recently the company stopped making bodies for other automobile organizations with a view to using surplus capacity for government work.

—

New Era to Make Parradee Bumper

GRAND RAPIDS, May 19—The New Era Spring & Specialty Co., of which Smalley Daniels is president, has purchased the plans, manufacturing rights, machinery and equipment of the Parradee Spring Auto Bumper, and has added this to its regular line. Edward Parradee, the inventor, will superintend the manufacture of the bumpers.

In spite of transportation difficulties, the New Era company reports an increase of 50 per cent over the business done last year. Two adjoining buildings have been added to the plant to increase manufacturing facilities.

—

Chief Motor Gets Port Huron Plant

PORT HURON, MICH., May 21—The Chief Motor Co., formerly of Canada, has purchased a plant here, and will manufacture engines for farm tractors. The company, which was organized by J. G. and H. S. Erd, former heads of the Erd Motor Co., Saginaw, is capitalized at $1,000,000. About 300 men will be employed, and officials say that the company expects to start with a daily manufacturing capacity of between 20 and 25 engines. The organization is operating a plant in Toronto.

—

Arrow-Grip Reorganized

GLEN FALLS, N. Y., May 21—The Arrow-Grip Mfg. Co. has been reorganized with a capital of $100,000, and will continue the manufacture of non-skid devices for motor trucks. Other accessories will also be manufactured. Officers have been elected as follows: President, George Tait; vice-president, William H. Dennin; treasurer, T. M. Avery, and secretary, E. G. Mertens. The company has established sales branches in New York and Chicago, and is planning to establish others in Montreal and San Francisco.

Limit Oil Products for Roads

Fuel Administration Will Pass on All Applications for Such Supplies

WASHINGTON, May 22—Use of oil and coal products in public road work will be limited for the period of the war. Petroleum, asphalt or tar products wanted for building or repairing roads will be delivered, it has been announced, only after the approval of the application by the committee representing the Fuel Administration and the office of Public Roads, Department of Agriculture.

State Highway Departments will pass on all applications in their territories involving the use of these materials. The applications will then be sent to L. W. Page, chairman of the committee, which will consider the necessity of the material and make final recommendations to the Oil Division of the Fuel Administration. The plan to issue permits is designed to prevent further deterioration of the road and at the same time satisfy the fuel oil requirements of the Army and Navy, essential war industries and the Allies. Upwards of $1,000,000,000 worth of bituminous macadam roads have been constructed in this country and the office of Public Roads hopes through the permit plan to maintain them and still conserve fuel oil.

Officials of the Oil Division of the Fuel Administration state that the United States is now being drawn upon to a constantly increasing extent for petroleum products and especially fuel oil, and that the supply of fuel oil is limited sufficiently to warrant deferring all new road construction involving these materials this year, except where such roads will be of war value.

Forms for applications for petroleum, asphalt or tar products for highway work can be obtained from the State Highway Departments or the office of Public Roads. They require detailed information as to the length, location, general uses and military necessity of the highways to be built, maintained or repaired.

—

Detroit-Wyandotte Sold

WYANDOTTE, MICH., May 20—All property, including machinery, material parts, equipment, etc., of the Detroit-Wyandotte Motor Truck Co. was sold recently and brought $45,000. It was purchased jointly by the New Jersey Machine Co., Newark, and S. L. Winternitz & Co., Chicago. It is understood that these companies will offer the machinery and goods at auction. The factory and real estate of the truck company will be sold later. These are valued at $65,000.

—

Maxwell to Make 50,000 Cars

DETROIT, May 22—If no further restrictions are ordered, the Maxwell company expects to manufacture between 50,000 and 55,000 passenger cars in 1918. During the year ending July 31, 1917, the production was 70,000, and during the calendar year of 1917, slightly more than 70,000. It is expected that the Chalmers company will manufacture at least 6000 cars as compared with 10,000 in 1917.

The Maxwell company has Government orders amounting to more than $20,000,000, including contracts for tractors, mine anchors and trucks. The company is able to take on additional war orders in conjunction with its passenger car schedule.

—

Power Truck & Tractor Elects Officers

PONTIAC, MICH., May 22—Officers have been elected by the newly formed Power Truck & Tractor Co. as follows: President, Leslie R. Acton, formerly director of Redden Motor Truck Co.; vice-president and engineer, L. P. Helm, formerly director and engineer of Olympian Motors Co.; secretary and treasurer, George L. Brush, formerly with the Studebaker Company. Howard W. Walton, formerly eastern sales manager of Signal Motor Truck, will be sales manager, and F. W. Thomas, formerly designer and engineer of the Sandusky Tractor Co., will be tractor engineer.

A factory site has been selected in Detroit and the company will be ready to occupy the new plant June 1 and begin production before fall.

—

16,000 Tires a Day from U. S. Rubber

NEW YORK, May 22—It is stated that the United States Rubber Co. is at present producing 16,000 pneumatic tires a day in its Hartford and Indianapolis plants; the Morgan & Wright plant in Detroit is producing about 12,000 a day. At the Providence plant, the company is producing about 1000 solid tires a day. The company has sufficient crude on hand to last about 4 months.

—

Truck Trip Raising Funds

DETROIT, May 21 — Under the auspices of the Official French Aerial Warfare Commission, a federal truck carrying a collection of paintings by Farre is going westward overland, visiting principal cities en route. It has stopped at New York City, Washington and is now in Pittsburgh. The complete itinerary has not yet been decided upon but it is planned to have the following cities visited: Cleveland, Detroit, Chicago, Dayton, Minneapolis, St. Louis and Omaha. The funds collected at the various cities will be given to the Society for Widows of French Aviators.

—

Contracts for Navy Awarded

WASHINGTON, May 21—Following is a list of contracts placed by the Bureau of Supplies and Accounts of the Navy:

May 16

Klaxon Co., Newark, N. J.—howlers.
Curtiss Aeroplane & Motor Corp., Buffalo, N. Y.—propellers.

May 17

Goodyear Tire and Rubber Co., Akron, Ohio —airships.

Will Release 30,000 Mechanics

N.A.D.A. by Cutting Unnecessary Service Will Reduce Repairshop Forces

ST. LOUIS, May 20—It is expected that 30,000 men will be released from retail automobile establishments for war service as the result of definite plans set under way at a two-day meeting of the board of directors of the National Automobile Dealers' Assn. held here Friday and Saturday. This is in addition to the thousands of mechanical experts who have already entered various branches of the military service from automobile factories and service stations.

This action followed a request from the War Economy Board at Washington, of which A. W. Shaw is chairman, for the adoption of such measures by the automobile dealers and distributers of the country as would release still more trained, all-round mechanics for military service where mechanical skill is required.

President F. W. A. Vesper of this city reported to the board of directors of the association that the War Economy Board had approved eight recommendations which had been previously drawn up by the War Service Committee, representing the Automobile Dealers of the United States.

These recommendations cover the following points:

1—Elimination of unnecessary service, which, it is anticipated, would free many men.

2—The elimination of Sunday and night service except on cars used for commercial purposes.

3—The education of mechanics so that a greater number of men will be trained in the handling of combustion engines and motors.

4—The establishment of a cash basis to eliminate clerical help and office maintenance.

5—The education of automobile owners in making minor repairs and adjustments instead of depending on service stations for such minor work.

6—Economies in the use of fuel and lubricants and reduction in demonstrations and similar uses of cars which it has been necessary for the dealers themselves to maintain and keep out of necessary general use.

It is estimated by officers of the N. A. D. A. that an average of one man would be released from every retail automobile establishment in the country. This is stated by the officers to be an extremely conservative estimate. Six and seven men engaged in Sunday and night service are not an unusually large number under the old-time arrangements, it is said. As there are nearly 30,000 automobile dealers in the country, the putting into effect of the approved war-time policies, it is anticipated, would immediately make about 30,000 men available for helping those who have already gone to take care of the American airplanes and motor trucks.

Representatives from several cities announced that steps had already been taken for the reduction of Sunday and night service, and that in those cities where the dealers had united in the elimination of unnecessary work, central stations had been opened for performing necessary emergency work.

St. Louis has arranged to go on a war basis on June 1, on which date night and Sunday shifts in service stations will be eliminated.

—

2209 Curtiss Planes in 1 Year

BUFFALO, N. Y., May 22—In the 12 months ending April 1, 1918, the Curtiss Aeroplane & Motors Corp. manufactured and delivered 2209 aeroplanes. In addition, the company built and delivered 2025 OX engines, and 389 V2 aeroplane engines, during 1917. Of the 2209 planes, 1376 were of the preliminary training type and 339 were for advanced training. In the total number, 31 models were included. Two types of seaplanes are being made for the Government, one equipped with a single, the other with a double engine.

—

Fruehauf Business Increased

DETROIT, May 22—The Fruehauf Trailer Co. has enlarged its dealer organization and now has representatives in all states. It reports that business is increasing rapidly. Last February was the biggest month the company has ever had, but this was doubled in March. The company is now manufacturing 12 different types of trailers.

—

Detroit Pledges $1,688,550 for Patriotic Fund

DETROIT, May 23—Detroit pledged $1,688,550 of its $7,000,000 Patriotic Fund quota during the first two days of the drive. On the first day, Toledo subscribed $306,203 of its $3,000,000 War Chest quota. Of this amount, which includes $50,000 subscribed by John N. Willys, $95,000 came from corporations.

Cleveland's Victory Chest quota is $6,000,000, but reports of donations have not yet come in. Michigan exceeded its $3,000,000 quota the first day, being the first state in the union to go "over the top."

A partial list of Detroit company donations follows:

Company	No. of Employes Subscribing	Donation
Briscoe Mfg. Co.....	298	$5,047
Detroit Lubricating Co.	555	10,176
Ford Motor Co.....	2000	36,000
Bowen Products Corp..	—	7,011

The amount subscribed to the $3,000,000 quota by various counties was:

Houghton	$85,000
Ingham	75,000
Calhoun	50,000
Jackson	50,000
Kalamazoo	50,000

The manufacturers' committee in Grand Rapids raised $101,594 of the $196,030 already subscribed. Seventeen thousand employees have pledged $3 each so far.

Mulford and Oldfield Win at Uniontown

UNIONTOWN, May 16—Ralph Mulford, driving a Frontenac, won the feature event at the speedway here to-day, winning his heat in the Liberty Sweepstakes at 95.3 m.p.h. and the final at 97 m.p.h. Eddie Hearne, in another Frontenac, was second, and Tommy Milton in a Duesenberg third. The race was run in five heats of 27 miles each. Barney Oldfield, driving his "Submarine," won a match of 5 laps, or 5⅝ miles, from Louis Chevrolet in a Frontenac in 3:18.51, which is at the rate of 102 m.p.h. Approximately 18,000 people saw the races, the attendance being considerably better than at the last meet on Thanksgiving Day in 1916. The summary:

MATCH RACE

(5 laps, 5⅝ miles)

Driver and Car	Time	M.P.H.
Barney Oldfield, Submarine...	3:18.51	102
Louis Chevrolet, Frontenac...	3:18.72	101.9

LIBERTY SWEEPSTAKES

First Heat

Driver and Car	Time	M.P.H.
Tommy Milton, Duesenberg..	15:59.52	101.1
Ralph Mulford, Frontenac....	17:51.69	91
I. P. Fetterman, Peerless....	18:21.1	90

Second Heat

Driver and Car	Time	M.P.H.
Ralph Mulford, Frontenac....	16:37.09	95.3
Barney Oldfield, Submarine...	17:22.3	93.1
I. P. Fetterman, Peerless.....	17:23.75	93
Omar Toft, Miller.....	17:33.89	92.12

Third Heat

Driver and Car	Time	M.P.H.
Eddie Hearne, Frontenac....	16:49.64	94.85
Fred McCarthy, Hudson.....	17:51.73	91.20
Omar Toft, Miller.....	17:52.13	91.10

Fourth Heat

Driver and Car	Time	M.P.H.
Louis Chevrolet, Frontenac...	17:03.68	93.4
Fred McCarthy, Hudson.....	17:40.82	91.5
Geo. B. Gardner, Hudson....	18:29.75	87.5

Fifth Heat

Driver and Car	Time	M.P.H.
Ralph Mulford, Frontenac....	16:42.82	97
Eddie Hearne, Frontenac....	16:58.77	95
Tommy Milton, Duesenberg..	17:35.18	93

—

$32,340,150 for Navy Aircraft

WASHINGTON, May 22—The Naval Appropriation Bill for $1,587,656,540 was reported to the Senate to-day. This bill includes $32,340,150 for aviation.

—

Sixteen Entries for Sheepshead

NEW YORK, May 22—Promotor W. H. Wellman, who is to stage a racemeet on Sheepshead Bay Speedway on Decoration Day, is understood to have signed up sixteen entries. The entry list closes May 25. According to the tentative program there will be two races, one a 10-mile handicap and the other a revival of the Harkness Trophy Race which will also be a handicap and will go 100 miles. Both races are Class E, non-stock events limited to cars of 300 cu. in. piston displacement or less. The entries follow:

Driver	Car
Barney Oldfield	Golden Submarine
Dario Resta	Peugeot
Ralph De Palma	Packard
Ralph Mulford	Frontenac
Ira Vail	Mulford Special
Louis Chevrolet	Frontenac
Omar Toft	Miller Special
Denny W. Hickey	Hotchkiss Special
Red Fetterman	Peerless
Fred McCarthy	Hudson
Tom Milton	Hudson
Not Selected	De Lage
Not Selected	De Lage
Percy Ford	Duesenberg
Fluis Lecocq	Duesenberg
Rudolph Wehr	Wehr Special

—

Large Supply of Rubber on Hand

NEW YORK, May 22—Assurances that there is sufficient rubber on hand and in transit to care for normal requirements for some time into the future were given at a luncheon held by the Rubber Assn. of America for the War Service Committee of the Rubber Industry of the U. S. A. on May 10, the details of which have just been made public. On March 31 there was a total of 87,572 tons in the hands of importers and manufacturers and afloat. On Dec. 31, 1917, the total tonnage afloat and in stock amounted to 67,536 tons, so that stores increased 20,000 tons in the 3-month period. Following are the statistics:

	Tons
Crude rubber in importers' stores.....	11,224
On docks and in transit overland.....	20,754
Afloat for American ports.....	14,832
Crude rubber in manufacturers' stock.	18,512
In transit within the U. S.....	15,033
In transit, imported direct.....	7,215
Total.....	87,572

All of this is what is termed "free rubber," that is, it is not subject to the restrictive measures under which the importation of crude is limited to 25,000 tons during the current 3-month period. Only rubber which was shipped subsequent to May 8 is covered by this measure.

—

To Help in Airplane Investigation

WASHINGTON, May 22—Secretary of War Newton D. Baker has issued orders detaching Colonels Sidney D. Waldon, Edward A. Deeds and R. L. Montgomery, all of the Signal Corps, from their present duties in connection with aviation, and has directed them to report to the Attorney General for such cooperation and assistance as they can render in the aviation investigation with which the Department of Justice has been charged. Colonel Deeds, who is president of the Delco Co., Dayton, Ohio, has charge of airplane equipment, including production under General Squier. Colonel Waldon, who aided considerably in the work on the Liberty engine, has been in France under Brig. Gen. Frulois. Colonel Montgomery was formerly a member of the general staff and has recently been a member of the Aircraft Board.

—

Liberty Engines For Air Mail

WASHINGTON, May 22—Two of the airplanes for use in the aerial mail service between Washington, Philadelphia and New York will be equipped with Liberty engines. These planes will be in service before June 1. The Liberty engines are going to be used because in wind and electrical storms yesterday the aviators were unable to make headway, and it is expected that the powerful Liberty engine will cope with the storm conditions successfully.

Plan to Prevent Competition for Workers

Felix Frankfurter, Assistant to Secretary of Labor, Will Be in Charge of Executive Part of Labor Administration

WASHINGTON, May 21—Prevention of competition for workers, reduction of labor turnover, introduction of labor efficiency methods and establishment of wage standards will form the most important duties of Felix Frankfurter, recently appointed assistant to Secretary Wilson of the Department of Labor. Mr. Frankfurter is in charge of labor administration and is chairman of the War Labor Policies Board, and has outlined his new duties and policies under a public statement.

Mr. Frankfurter's work differs considerably from that of the National War Labor Board headed by ex-President William H. Taft and Frank P. Walsh, in that Mr. Frankfurter's work is administrative while the National War Labor Board is judicial and legislative and operates as a court of adjustment between employers and employees. Mr. Frankfurter's statement follows:

Since the outbreak of the war the United States Government has come to be the greatest single employer of labor in the country. Its plants are scattered north and west and south and east. The number of workers ultimately involved in the fulfillment of its orders runs into the millions. But it has had no operating policy with regard to the plants as a whole. Each one has been operated individually as a separate enterprise, quite apart from the others and, so far as the labor supply has been concerned, in actual competition with the others. A plant working on an important order for the War Department, for instance, has suddenly discovered that half its working force has disappeared because a plant in the neighborhood engaged upon orders for another department has offered a higher rate of pay for this or that class of labor. The labor turnover, the loss of motion and of production, because of this condition of affairs has been notoriously wasteful. The inducement has been created all over the country for men working in one industry to change their jobs and go where more money was obtainable, as a matter of fact, where it was offered to entice them away. It is, of course, too much to ask men not to leave their jobs under such circumstances. The difficulty is not with the men. It resides in the absence of any agency of government charged with the removal of causes of industrial instability and with the establishment of standards for industry as a whole. The Government assumed command of the physical machinery of industry, but in failing to centralize direction of the industrial personnel the harmony of operation it sought was destroyed. There being no machinery to prevent employers from wasteful competition for the labor supply, no adjustment of the labor resources to the productive needs of the country, it is not strange that labor seemed to become scarce and that industry suffered severe dislocation.

It is to remove these evils besetting the effort to attain and maintain maximum of production for the prosecution of the war that the new machinery has been set up by Secretary of Labor Wilson.

The War Labor Board and the board representing the various bureaus of the Labor Department will constitute a dovetailing process linking up every agency of the Government whose activities in any way involve the employment or the direction of labor. The Policies Board will be representative of the War Department, the Navy Department, the Department of Agriculture, the Emergency Fleet Corporation, the Railroad Administration, the War Industries Board and the National War Labor Board. Its functions, while in a sense technical, will be thoroughly administrative inasmuch as its decisions will be carried out by the Departments and agencies represented in its membership.

In the matter of wages it will not attempt to set a flat rate for any one craft or trade in the country as a whole; but it will fix standards to be determined for all industries in a given section of the country after investigations disclosing the conditions of life, including the cost of living and the service rendered. The facts will be ascertained justly and comprehensively from information to be sought from the workers' own organizations, private employers and their organizations, government bureaus, and wherever else exact knowledge may be secured.

We must husband our labor supply so as to satisfy the war need of the country to the fullest possible practical extent. It is necessary, therefore, that the sources of supply be wisely directed and employed. With respect to this phase of the industrial problem it will be the function of the War Policies Board to allocate the supply according to the productive needs of the country. Under decisions of the board on this score it will be impossible for one industry to draw the labor supply from another unless it has been regularly determined that the first industry has a higher claim upon the supply on the basis of a more pressing Government need than the industry from which it would draw the workers. This question will of course be determined by the War Policies Board. But by the establishment of standardized wage conditions the incentive for workers to leave one industry and go to another will have been removed.

In addition to controlling the labor supply by the methods just reviewed, the Policies Board will also regulate hours of labor in the various industries and determine the needs of industry with regard to housing and transportation facilities, etc.

The need of the hour is production, the fullest munitionary equipment and feeding of the forces at the front. Labor, industrial managers and Government officials are all heartily united to bring about this end. There will be the utmost pooling, not only of the industrial resources, but of the resources of good will and intelligence, and in this spirit the work will proceed efficiently. There is much to be done, but it will be done because it must be done.

Organization of the Government's new labor administration, headed by Mr. Frankfurter, began yesterday with the appointment of representatives of 5 departments clothed with authority to act for their respective chiefs in labor problems.

The representatives named yesterday are: War Department, Stanley King, special assistant to Secretary Baker; Navy Department, Franklin D. Roosevelt, assistant secretary; Agriculture Department, G. I. Christie, director of farm labor; Fuel Administration, John P. White, special labor adviser and former president of the United Mine Workers; War Industries Board, Hugh Frayne, special labor adviser. W. S. Carter, labor adviser to Director General McAdoo, probably will represent the railroad administration, and representatives of the Shipping Board will be named by Director General Schwab of the Emergency Fleet Corp. Ex-President Taft and Frank P. Walsh, joint chairmen of the War Labor Board, will represent the public for employers and employees respectively.

—

Goodrich Sales May Total $100,000,000

AKRON, OHIO, May 22—It has been estimated that gross sales of the B. F. Goodrich Co. will reach a total of $100,000,000 during 1918, as compared with $87,155,072 in 1917 and $55,416,866 in 1916. If the 1917 manufacturing ratio of 17.4 per cent is maintained, the company will earn between 16 and 18 per cent on the $60,000,000 common stock.

—

Du Pont Buys Share in Flint Varnish

FLINT, MICH., May 21—E. I. du Pont de Nemours & Co., Wilmington, Del., have purchased a large interest in the Flint Varnish & Color Works of Flint and Toronto. No change will be made in the board of directors, and W. W. Mountain will continue as president and general manager of the company. John N. Willys, W. C. Durant, C. W. Nash, R. S. McLaughlin and W. W. Mountain, all present stockholders, will retain a large percentage of their stock, the rest being taken by the General Motors Co. and E. I. du Pont de Nemours & Co.

—

Curtiss Men Plan Club

BUFFALO, May 20—Plant managers, superintendents of departments and foremen representing the North Elmwood, Elmwood, Niagara, Churchill, Austin and Bradley Street factories of the Curtiss Aeroplane & Motors Corp. have decided to form a club. Erie Beach and its grounds will be leased for the summer, and exclusive use of the beach, hotel, tennis courts, baseball diamond, athletic field, dance hall and other equipment will be given to the club members. After Oct. 1 it is proposed to open a town clubhouse for the exclusive use of Curtiss club members. The club will be maintained, officered and managed by the Curtiss employees.

—

Palmer Heads Collier Truck

BELLEVUE, OHIO, May 21—R. A. Palmer, organizer and director of the Cartercar Co. from 1905 to 1912, has been elected president of the Collier Motor Truck Co. Associated with him are John F. Cool, formerly general manager of the Rapid Motor Vehicle Co., Pontiac, and Edwin S. Lewis.

—

Changes in Curtiss Personnel

BUFFALO, May 20—The following changes in the personnel of the factory

organization of the Curtiss Aeroplane & Motors Corp. have been announced: M. O'Shaughnessy has been appointed superintendent of Division B, boat final assembly, at Factory J, succeeding J. M. Lydiatt, resigned. J. F. Hansen has been made superintendent of assembly division No. 1 of the North Elmwood factory, which consists of the following departments: Dope, Covering, Panel and Final Wing Assembly. E. W. Nice has been appointed superintendent of the boat hull department at the North Elmwood plant, replacing Henry Kart, resigned.

—

Noyes-Buick Adds G. M. C. Trucks

BOSTON, May 21—On June 1 the Noyes-Buick Co., distributer of Buick cars in New England, will take over the G. M. C. truck branch. This will give the company all New England, Nova Scotia and New Brunswick territory for the trucks. M. E. Brackett, for the last few years manager of the G. M. C. branch, will have charge of retail sales and Mr. Noyes will direct wholesale sales.

—

Schools for Army Mechanics

KANSAS CITY, May 20—The two big automobile and tractor training schools in this city, the Sweeney and the Rahe, are to be used by the government to train 5000 men from the selected army this summer as motor mechanics. The men will come in groups of 1500 and be divided between the two schools. The course will take 2 months. The first contingent is already going through the school. Most of the men are from Iowa.

—

Service Stations for National Wire Wheels

GENEVA, N. Y., May 21—The National Wire Wheel Works, Inc., has opened service stations on the Pacific Coast in San Francisco, Fresno and Los Angeles. This service will be handled by the Electric Equipment Co.

—

To Assist in Aircraft Investigation

WASHINGTON, May 13—C. S. Coffee has been named special investigator to assist the Department of Justice in the aircraft investigation. Mr. Coffee is an assistant in the Department of Justice.

—

Dividends Declared

The Nash Motors Co. has declared a dividend of $15 a share on its common stock, payable May 31 to holders of record May 20. The first dividend paid by the company was $6 a share on Feb. 1, making the total disbursements on the common stock so far this year $21.

The Continental Motors Corp. has declared a dividend of 1½ per cent on common stock, payable May 25 to stock of record May 18.

The Michigan Stamping Co. has declared the regular monthly dividend of 1 per cent, payable June 1 to stock of record May 15.

The Amazon Rubber Co. has declared a quarterly dividend of 1½ per cent on common stock.

S.A.E. Hears New Uses of Standardization

Officials Recently Returned from Abroad Tell Metropolitan Section of Wartime Advance in Automotive Production

NEW YORK, May 21—Messages from the battlefront in Europe were delivered to the S. A. E. by officials who have recently returned from abroad and by an officer of the Motor Transport Section of the British Army at the monthly meeting of the Metropolitan Section held at the Automobile Club of America last night. General Manager Coker F. Clarkson reviewed the trip of the delegation of representatives of engineering societies and of government departments who went abroad in the interest of international aircraft standardization.

Confer on Aircraft Standardization

Mr. Clarkson told of the enormous development of airplane production in both countries, saying that thousands of planes are being sent to the front each month by each country.

The chief object of the trip was to confer on the possibility of international aircraft standards, and he believed that the conference would constitute a real advance. The committee had advisory powers only, and each section will make a report to its government.

Vice-President Manly, who was also a member of the delegation, spoke of the spirit of co-operation shown by the British and French people. If nothing else had been accomplished, the manifestations of whole-hearted co-operation on the part of the men in charge of the British aircraft program, from Lord Rothermere down to the lower officials, would have made the trip well worth the time, energy and risks involved.

Early Truck Experiences at the Front

Captain Crossley, of the British Motor Transport Service, spoke of his experiences on the front during the early part of the war. He said that when the war broke out the British Army possessed only a comparatively small number of motor trucks, and it was necessary to commandeer trucks on the roads. This gave them a great conglomeration of different makes and types, and the difficulties involved in keeping these in repair can readily be imagined. Not only were there a large number of different makes of trucks in use, but the drivers were also commandeered, and the great majority of them had absolutely no military training. They didn't know an officer from a private, and he had heard one of the drivers in a French seaport refer to an officer as "that bloke with a belt at the middle." The reception accorded the British forces in France in the summer of 1914 was cordial and helped to ease the difficulties due to nonpreparedness.

Captain Crossley said that at one time at the front they broke a bevel drive gear, and they needed another one so badly that instead of waiting for one from England they obtained a piece of steel and forged a new one at a wayside shop. They also made a number of stub axles in an old steel foundry, and although some of these stub axles lasted only for a single trip, they helped them out of difficulties.

The captain also told of the difficult conditions under which repairs often had to be made in the fields. In winter the repairmen sometimes had to stand out in the snow or mud while trying to align a bearing or doing a similar job, which was not conducive to their peace of mind. The two things required from an automotive standpoint to bring the war to a successful conclusion were standardization and quantity production.

President Kettering spoke of the bright future before the internal combustion engine and the great many technical problems still to be solved in connection with its further development and application. The great economic questions connected with our industry had not even to a small degree been worked out.

Irresponsible Criticism Condemned

He also made reference to the aircraft production program and administered a scathing rebuke to those who had criticised the men in charge of the aircraft work in an irresponsible manner. He deplored the fact that it was against the government policy to publish anything about the successes which had been achieved, while at the same time there was absolutely no restriction on derogatory reports concerning the work. Of all the experiments made in ordinary commercial development work, probably not one in ten was successful, and if the company should publish a detailed report of all the experiments which failed, it would not be able to borrow a dime at the bank.

Liberty Engine Defects Exaggerated

It had been alleged that the Liberty engine would not cool properly. President Kettering wanted to know what the engine had to do with cooling. It was the purpose of the radiator to keep the engine cool, and in determining the proper size of radiator, it was a question whether the engine should be kept cool when operating close to terra firma or when in "the business district" at an altitude of say 10,000 ft. In commercial work, if they found the radiator was not of sufficient size, they would make it slightly higher, but in this case the subject was made a national issue and debated by Congress. Then there had also been much talk about the lubricating system of the engine being defective. He thought that there was not a builder of gasoline engines who at one time or another had not had difficulty with lubrication. He was fully convinced that there had not been one bit more trouble with the Liberty engine as regards lubrication than there was with the average motor

Glover Heads Motor Transport Service

Promoted to Colonelcy—Will Supervise Purchase and Maintenance of Trucks

WASHINGTON, May 20—Major F. Glover of the Ordnance Department, who has been in charge of tractor work, has been promoted to a Colonelcy in the Quartermaster Department, and appointed by Brig. Gen. Wood, acting Quartermaster General, as Chief of the Motor Transport Service. He will have supervision of the purchase and procurement of all motor propelled vehicles except tanks, creeper-type tractors and other artillery tractors for all of the various divisions of the United States Army in this country and abroad.

He will co-operate with a number of officers comprising representatives of each division.

Detailed duties of Colonel Glover include technical supervision over maintainence and repair, organization, supply, operation and inspection of motor driven vehicles, motor repairshops and garages, and a department for supplying spare parts, gasoline, lubricants and miscellaneous supplies. He will also confer with the Ordnance Department, which will have charge of purchases of tanks, creeper-type and artillery tractors, in regard to these vehicles.

Colonel Glover, prior to entering the military service was the general manager of the Emerson-Brantingham Co., tractor manufacturer, Rockford, Illinois.

The naming of Colonel Glover marks the culmination of 7 months effort on the part of Christian Girl and members of the automobile industry in Washington, who have worked for the pooling of all truck activities to prevent duplications in procurement, contracts, inspection, designing, etc., besides eliminating in this way the competition between the various divisions.

It also brings to a climax the fight against the standardized trucks. Colonel Glover's views regarding the Class B, A and AA trucks have not yet been made public.

It is reported in Washington that Walter White of the White Co., Cleveland, and C. W. Nash of the Nash Motors Co., Kenosha, both opponents of the standardized truck plan were offered positions in charge of the Motor Transport Service prior to the acceptance of that position by Colonel Glover. Both of these men are known to oppose the standardized program.

—

Curtiss Elects Officers

BUFFALO, N. Y., May 22—Following are the officers and directors elected at the annual meeting of the Curtiss Aeroplane & Motors Corp. held recently:

Glenn H. Curtiss, chairman of the board of directors; John North Willys, president; James E. Kepperley, vice-president and general manager; C. M. Keys, vice-president; E. C. Morse, vice-president; W. W. Moss, vice-president and comptroller; B. A. Guy, secretary and assistant general manager; J. F. Prince, treasurer; H. M. Root, assistant comptroller; J. J. Donahue, assistant treasurer; J. F. Weber, assistant secretary.

The board of directors consists of Glenn H. Curtiss, C. H. Conners, Harry Evers, B. A. Guy, C. M. Keys, James E. Kepperley, W. A. Morgan, W. W. Moss, F. H. Russell, J. Allan Smith, G. C. Taylor, J. N. Willys, Rodman Wanamaker, W. B. Stratton and J. A. D. McCurdy.

COLONEL FRED GLOVER

Newly appointed Chief of the Motor Transport Service

—

Second Credit Managers' Conference Meets

ATLANTIC CITY, May 23—The second conference of Credit Managers of firms belonging to the Motor & Accessories Manufacturers has been in session here for two days and the work of some special committees is not yet completed. While the attendance has been smaller than that of the first conference held in Cleveland, the interest in the work has been as great. The session of Tuesday forenoon was taken up entirely with trade acceptances. These acceptances are being used to a much greater extent, and the bankers invited to discuss them answered a great many questions relative to their use. Over fifty concerns were represented at the conference.

—

Elkhart Making 4-Passenger Model

ELKHART, IND., May 22—The Elkhart Carriage & Motor Car Co. is manufacturing a new 4-passenger model with both a 4- and 6-cylinder standard Elcar chassis. It differs from the regular models only in body and finish. The body is custom built with bevelled edges. The doors are square instead of "U" shaped and the bevelled edge is a darker color than the body. The model on a 4-cylinder chassis will sell for $1,175 and on a 6-cylinder chassis $1,375.

—

Fulton Adds Body Plant

FARMINGDALE, L. I., May 22—The Fulton Motor Truck Co. has added a body-building plant to its factory.

Standardized Trucks Tested

War Department Tests Officially A, AA and B Models—Report Not Ready

WASHINGTON, D. C., May 23—The opposition to the standardized war truck program still continues, the attacks being not only on the A and AA but also on the B. Those favoring the standardized truck program have taken the matter up with Secretary of War Newton D. Baker, to have a series of rigorous tests conducted. These have already been made during the past week by army officers and the results should be made public in the near future.

Although the A and AA models have been ready to build for some time, there has been no authority given to have them manufactured. Both of these models have been tested to the satisfaction of those back of the standardized truck program, but it is expected that the official war test made last week will form the basis of the only completely official report. Although up to the present the A and AA have been side tracked in the placing of orders, those favoring the more complete standardization program believe that these models will yet come through.

There are to-day approximately seventy-two different makes of cars and trucks with our forces in France. The problem of handling supplies and spares for these is a terrific one.

The rumors that those favoring standardized truck program were responsible for orders for standard commercial truck models being placed last fall before the Class B truck was ready for production, have been denied. There never was a time when orders for commercial trucks were held up due to the desire to place contracts for Class B.

2200 Class B Delivered

Up to this time, 2200 Class B trucks have been delivered. At present, ocean tonnage is not adequate to handle the truck exports to the war zone, and there are to-day approximately 4500 motor trucks awaiting shipment along the Atlantic seaboard.

Christian Girl, director of engineering and production of standardized trucks, is still holding his position in Washington. Mr. Girl tendered his resignation in January to take effect on May 1 but has not as yet had official acceptance of it. There have been reports to the effect that he has been asked to continue his work, but Mr. Girl states he will not reconsider his resignation.

—

Tractor Lubrication—Correction

In our report of a recent meeting of the S. A. E., Minneapolis Section, Mr. Mahoney, of the Vacuum Oil Co., was quoted as follows: "The Vacuum Oil Co. has oil for each part of the engine on the market. They tell the farmer

which oil to use, and if a tractor falls down, due to the oil used, that oil will be sold no more in that district where it did not work."

It appears that our correspondent did not get the correct meaning which Mr. Mahoney tried to convey. We are informed that what he actually said was: "If a tractor falls down and fails to operate efficiently, that tractor cannot be sold in the district where it does not work."

—

Additions to Export Conservation List

WASHINGTON, May 19—The following commodities have been placed on the export conservation list, effective May 17, 1918, by the War Trade Board:

Asbestos, as follows: Paper stock, sand, shingle stock.

Bearings, as follows: Antifriction, babbitt (unless an integral part of a complete machine). Individual licenses not required to Canada and Newfoundland for bearings, only for machines not on Export Conservation List.

Spelter (individual licenses not required to Canada and Newfoundland).

Tin, as follows: Lamp founts, lanterns, tinned rivets.

Silk, as follows: Rubberized, suitable for use in the manufacture of aircraft.

—

Part of Import License Revoked

WASHINGTON, May 19—The general license covering the importation of all commodities of less than $100 value has been revoked by the War Trade Board in respect to all articles on restricted lists or any supplements thereto for shipments made after May 10, 1918. The general license covering importation of commodities not on restricted lists or supplements and less than $100 value is still effective.

—

University Training for Mechanics

ANN ARBOR, MICH., May 21—The government has accepted the University of Michigan's offer to train enlisted mechanics here in automobile repairing. The first 700 men will arrive June 15, and the training period will be 8 weeks. A second detachment of 700 will come Aug. 15, by which time the faculty hopes to have the new Union building available as barracks and mess hall. A cantonment type of building will be erected immediately in which to train the mechanics in chassis work.

—

College Seeks Trade Literature

EAST LANSING, MICH., May 21—The department of mechanical engineering of the Michigan Agricultural College, which will train 500 soldiers as automobile mechanics and repair men, wishes to receive as many copies of all trade literature such as catalogs, instruction books, etc., as possible. Companies desiring to assist in this work should address their literature to J. A. Polson, Professor of Mechanical Engineering, Michigan Agricultural College, East Lansing, Mich.

More Tire Increases Made

Goodrich Adds 2 to 3 Per Cent to Prices—Fisk Makes 2½ to 10 Per Cent Advance

NEW YORK, May 20—Another slight increase in tire prices has been made by the B. F. Goodrich Co. and the Fisk Rubber Co. Goodrich has increased the price of fabric tires of all sizes from 2 to 3 per cent, and Fisk has made increases varying from 2½ to 10 per cent, according to size. Although it is freely predicted that other companies will make further increases, none of them has, as yet, done so. Kelly-Springfield, which did not increase at the time other companies did so, about the third week in April, has raised its lists 10 per cent, effective at once.

The increases are ascribed largely to a shortage of the proper grade of cotton for fabrics and to the rising cost of labor. It is stated that whereas tire manufacturers generally require 80,000 bales of Sea Island cotton for a normal year's output, insect pests and other causes have reduced this year's possible supply to about 60,000 bales. Of this the government has requisitioned probably 50,000 bales, leaving only a small amount for tire manufacturers. The exact effect on the industry cannot be estimated, though the suggestion is offered from some quarters that this may bring about the production of unguaranteed tires. Some factories are at present working from day to day on the cotton they receive, though some of the others are fairly well stocked.

The rubber situation is not causing any apprehension. Imports have been coming in freely during the last few weeks, and all the rubber that was afloat on May 8 will be admitted without restriction. In view of reduced automobile production, it is thought that there will be no shortage of rubber for tires.

—

Two Men Leave Aluminum Castings

DETROIT, May 18—R. F. Dyer, formerly assistant sales manager of the Aluminum Castings Co., has resigned to become sales manager of the Parrish Mfg. Co. Charles B. Bohm, also formerly with the Aluminum Castings Co., has left the company to enter business for himself. His company is known as Charles B. Bohm Foundry Co., and will make aluminum and bronze castings.

—

Captain Resnati Killed in Fall

NEW YORK, May 18— Captain Antonio Silvio Resnati of the Royal Italian Flying Corps, and pilot of several of the Caproni planes, was killed in a fall at Mineola Field yesterday. Improper judgment of his take-off speed combined with a side-slip while at an altitude of about 50 ft. caused the fall. Captain Resnati was 25 years old and first came into prominence last September when he attained an altitude of 17,000 ft. at Langley Field. Later he made a flight from that field to Mineola, carrying nine passengers, in 4 hr. 2 min. Captain Resnati met his death on the eve of an attempt to fly across the Atlantic in a new giant Caproni which was being especially built for the trial.

—

Nash Earns $2,027,783 in 15 Months

KENOSHA, WIS., May 21—The Nash Motors Co. earned net profits of $2,027,783 in the period from Aug. 16, 1916, to Dec. 1, 1917, and at the latter date had a surplus of $1,590,283 as compared with $825,850 in Aug., 1916. During the period, $437,500 was paid in preferred dividends.

The balance sheet as of Nov. 30, 1917, shows cash on hand and in banks of $1,039,351; current assets of $6,782,839, and current liabilities of $1,666,234. Total assets and liabilities were $10,111,255.

—

To Test "Garabad" Soon

WASHINGTON, May 15—Garabad T. K. Giragossian, inventor of a free-energy machine, held a final conference with Secretary of the Interior Lane yesterday, and is understood to have requested a change of the regulations prescribed for testing his machine. He stated he would be ready for his first tests within a month and possibly within 10 days.

—

Signal Corps Offices Consolidated

WASHINGTON, May 15—The Signal Corps has moved all offices now located in a number of places throughout the city to 4½ Street and Missouri Ave. N. W.

—

Motor Transport To Move

WASHINGTON, May 18—The Office of the Engineering and Production Section of the Motor Transport Service, Q. M. C., headed by Christian Girl, has moved from 1421 I Street to Seventh and B Streets.

—

Lewis Resigns from Timken Axle

DETROIT, May 18—Eugene W. Lewis, who has been vice-president and a director of the Timken-Detroit Axle Co., has resigned in order to devote his entire time to government war activities. As a result of his resignation, the following changes in personnel of the company have taken place: A. R. Domery, vice-president, is now also general manager; Frederick C. Gilbert, secretary, has been made vice-president in charge of sales and advertising; C. W. Dickerson, who is treasurer, has been given the added responsibility of secretary.

—

Bonus to Standard Employees

CLEVELAND, May 16—The Standard Parts Co. has ordered a bonus of 5 per cent of last year's salary paid to all salaried employees of the company. This bonus is paid in stock bought at market price. To employees who were not with the concern the entire year the percentage remains the same on the total salary paid during that period.

Will Make Schofield Tractors in 10 Zones

KANSAS CITY, May 20—The Automotive Tractor Corp., which is capitalized at $250,000 and manufactures the Schofield farm tractor, a steel frame work mounted on 4 wheels which is able to carry any ordinary passenger automobile furnishing the motive power, is making contracts for the right to produce the tractor in 10 zones in the United States.

Zone contractors will manufacture the machines and distribute them in their territory. Each zone man, however, is required to put into his territory at various centers a prescribed number of demonstrators, the number being calculated by the home company on the basis of the number of farms in the zone. The zone companies are also under contract to manufacture up to a definite standard, and to distribute a certain number of machines each year. The home company takes the position that there should be a tractor on every 160-acre farm.

Zone No. 1 has been contracted for by the Automotive Tractor Co., and includes 5 states of the Atlantic Coast, with headquarters at Frederick, Md. Casper E. Cline is president of the company; Dr. Geo. M. Smith, treasurer, and Thomas E. Kling, secretary. This company has purchased a factory and is adding to the buildings and equipment. There are 2 acres of factory buildings and an additional 7½ acres for demonstrating. The first demonstration was made May 2, 1918, 2500 farmers witnessing it.

The home company has 4 zones in northern and eastern territory practically contracted for, where manufacturing facilities are under control of zone people so that manufacturing can be started within the next month or so.

The Kansas City zone will probably be contracted for within a few days. The company negotiating has 27 acres of ground and facilities for making 10,000 tractors within the year. This company probably will be delivering 1000 machines a month by August.

All the contracts provide that the distribution shall be through dealers. Any sales made by demonstrators representing the zone contractors must be cleared through dealers.

—

Nash Price Increase Scheduled

KENOSHA, WIS., May 20—The Nash Motors Co. will increase the price of passenger cars and trucks on June 1 as follows:

Passenger Cars

Model	New Price	Old Price	Increase
5-pass. touring	$1,395	$1,295	$100
4-pass. roadster	1,395	1,295	100
6-pass. sedan	2,085	1,985	100

Truck Chassis

1-ton	1,595	1,495	100
2-ton	2,075	1,875	200
Nash Quad	3,250	3,250	....

The company is manufacturing a new 7-passenger touring model which will sell for $1,545, and a 4-passenger coupe to cost $2,085.

—

Dort to Increase Prices $60

FLINT, MICH., May 21—The Dort Motor Car Co. will increase its factory prices $60 on June 1. The new prices will be:

Model.	Price
Touring	$925
Roadster	925
Sedan	1325
Coupe	1325
Sedanette	1060

Detroit Manufacturers Get More Freight Cars

DETROIT, May 18—Outgoing freight from the factories in this territory is moving more freely, and most of the plants are obtaining a large percentage of the cars they need. Packard is not experiencing any difficulty in securing cars, nor is the Paige-Detroit.

Less than 25 per cent of the production of Paige is driven away, and part of this goes over the water. Shipments from the Packard plant to the East are sent to Buffalo by boat, and there the cars are unloaded and called for by distributers, who drive them to Pittsburgh and New York. Cadillac sends 18 per cent of its production by water; only 2 per cent is driven overland for the entire distance.

The demand for cars in this territory is apparently good, and most dealers feel optimistic about the future. They believe the demand will naturally increase as the weather improves; but because of the shortage of cars they feel that they will be unable to obtain enough to meet their requirements.

Used cars are in greater demand than ever before, and higher prices are being paid for them. Increased demand, however, is expected throughout the cities rather than in rural districts. The wheat acreage this year, being much below normal, is discouraging. This, together with the fact that many farmers' sons, on whom the farmers depended to drive their cars, have departed for military service, reduces the field of sales possibilities in the rural communities.

As compared with last year, motor truck sales are 25 per cent less, but are steadily picking up. Passenger car sales, however, are 25 per cent better than last year's figures.

Automotive Securities Quotations on the New York and Detroit Exchanges

	Bid	Asked	Net Ch'ge
*Ajax Rubber Co.	54	64	..
*J. I. Case T. M. Co., pfd.	85	89	+1½
Chalmers Motor Co., com.	6	8	..
Chalmers Motor Co., pfd.	30	40	..
*Chandler Motor Co.	82	83	+1
Chevrolet Motor Co.	124	127	+1
*Fisher Body Corp., com.	32	35	..
*Fisher Body Corp., pfd.	82	87	..
Fisk Rubber Co., com.	49	52	..
Fisk Rubber Co., 1st pfd.	98	103	..
Fisk Rubber Co., 2nd pfd.	70	75	..
Firestone Tire & Rubber Co., com.	91	94	—1
Firestone Tire & Rubber Co., pfd.	94	96	+1
*General Motors Co., com.	124	127	+6¼
*General Motors Co., pfd.	79	81	+1
*B. F. Goodrich Co., com.	44	45	..
*B. F. Goodrich Co., pfd.	95	100	..
Goodyear Tire & Rubber Co., com.	142	146	..
Goodyear Tire & Rubber Co., pfd.	96	98	..
Grant Motor Car Corp.	2½	3½	..
Hupp Motor Car Corp., com.	2¾	3¼	..
Hupp Motor Car Corp., pfd.	79	85	..
International Motor Co., com.	22	25	—3
International Motor Co., 1st pfd.	50	56	—2
International Motor Co., 2nd pfd.	27	32	..
*Kelly-Springfield Tire Co., com.	46	47	+1¼
*Kelly-Springfield Tire Co., 1st pfd.	76	88	+3
*Lee Rubber & Tire Corp.	17	17½	+2½
*Maxwell Motor Co., Inc., com.	26	28	+1
*Maxwell Motor Co., Inc., 1st pfd.	54	56	+1
*Maxwell Motor Co., Inc., 2nd pfd.	19	21	—3
Miller Ruber Co., com.	101	104	—1
Miller Rubber Co., pfd.	94	96	—1
Packard Motor Car Co., com.	105	112	+7
Packard Motor Car Co., pfd.	91	..	+2
Paige-Detroit Motor Car Co.	16	18	..
Peerless Truck & Motor Corp.	13	16	—1
Portage Rubber Co., com.	104	108	..
Reo Motor Car Co.	14	16	..

	Bid	Asked	Net Ch'ge
*Saxon Motor Car Corp.	8¼	9¼	+1¼
Standard Motor Construction Co.	11	13	—1
*Stewart-Warner Speed. Corp.	57	59	—2
*Studebaker Corp., com.	41	42	+5
*Studebaker Corp., pfd.	75	90	+10
United Motors Corp.	24	25	+1
*U. S. Rubber Co., com.	58	59	+1
*U. S. Rubber Co., pfd.	104	106	+1½
*White Motor Co.	41	42	+2
*Willys-Overland Co., com.	19	20	+2½
*Willys-Overland Co., pfd.	80	82	..

*At close May 18. Listed N. Y. Stock Exchange.

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

ACTIVE STOCKS

	Bid	Asked	Net Ch'ge
Auto Body Co.	..	7¾	..
Bower Roller Bearing Co.	19	..	+1⅜
Chevrolet Motor Co.	..	125¾	..
Commerce Motor Car Co.	10¼	11	+ ⅝
Continental Motor Car Co., com.	5⅜	5⅝	..
Continental Motor Car Co., pfd.	..	..	..
Edmunds & Jones, com.	14	17	..
Edmunds & Jones, pfd.	80	90	..
Ford Motor Co. of Canada	180	190	+7
Hall Lamp Co.	..	14½	..
Michigan Stamping Co., com.	13¼	..	— ½
Motor Products	..	..	..
Packard Motor Car Co., com.	108	..	+2
Packard Motor Car Co., pfd.	91¾	..	..
Paige-Detroit Motor Car Co.	..	17	..
Prudden Wheel Co.	11¾	..	..
Reo Motor Car Co.	14¾	15	..

INACTIVE STOCKS

Atlas Drop Forge	..	26	..
Kelsey Wheel Co.	90	92	..

Grant Motor to Reopen Vacated Findlay Plants

FINDLAY, May 16—The Grant Motor Car Corp., Cleveland, will reoccupy its vacated plants in this city at once and begin the manufacture of munitions for the Government, contract for which has just been received. The plant will be placed in readiness as soon as possible, the machinery and equipment for it being en route now. It is expected that work will be started within a week. Eight hundred men will be employed at once.

—

Ross Sale Brings $37,500

DETROIT, May 21—The auction sale of the equipment and stocks of the Ross Automobile Co. held last week brought $37,500. There were approximately 125 buyers present and the sale continued from 10.30 a. m. to 5 p. m. The entire stock was sold in separate parcels—630 lots in all. No bids were offered when it was put up in bulk. There were parts sufficient to make 10 complete cars, and these were arranged in car lots and offered in this manner. Each car lot brought $950, the regular price on the Ross Eight at retail being $1,850. The entire stock was valued at approximately $80,000.

—

Prest-O-Lite Discontinues Milwaukee Branch

MILWAUKEE, May 20—The Prest-O-Lite Co. has discontinued its branch here. The building is now occupied by the Wisconsin Magneto Co.

—

Continental Has $20,000,000 in Orders

DETROIT, May 18—On April 30, when the first half of the fiscal year of Continental Motors Corp. ended, the orders on its books, in process of manufacture and unfilled, amounted in the aggregate to more than $20,000,000—a considerable gain over the situation at the beginning of the fiscal year. Large additional orders have been received from the Government.

—

Uses Motor Truck to Get Supplies

KALAMAZOO, MICH., May 21—Fuller & Sons Mfg. Co. is operating a 5-ton truck between its plant and various sources of needed supplies. Several long distance trips for materials have been made, and the company reports that loads have been brought in at about the same cost as expressage and in much shorter time.

—

Ford Des Moines Plant Nearly Ready

DES MOINES, May 21—The new plant of the Ford Motor Co. here will be put in operation on June 1. The Omaha plant of the company was taken over for government work, and this caused the local plant to be rushed to completion. From 400 to 500 men will be employed, and it is expected that the output will reach 200 cars a day. Within 3 months, 1000 men will be employed and the daily production increased to 400 cars. Manufacture of Ford cars for Iowa, Nebraska, part of Kansas and South Dakota will be handled at this plant.

—

Current News of Factories

Notes of New Plants—Old Ones Enlarged

Eleven States Have Fordsons

DETROIT, May 16—Up to the end of the first week in May Fordson tractors have been shipped to the following states: North and South Dakota, Nebraska, Iowa, Tennessee, Wisconsin, Michigan, Ohio, Massachusetts, Kentucky and Virginia. State contract sales are now beginning to go to the trade through the regular agents or agencies for the tractor, who find the farmers ready to buy on sight. There is no letting up in demand for the tractor.

—

Fordson Distributers Named

DETROIT, May 18—Henry Ford & Son have appointed the following distributers for the Fordson tractors:

Hippodrome Motor Co., Nashville..Tennessee
Universal Motor Co., Richmond.....Virginia
De Tamble Tractor Co., Winstom-Salem
North Carolina
Duttee W. Flint, Providence..New England
E. F. Bell, Spartanburg.....South Carolina
Bryant Tractor Co., Columbus.....Ohio
T. W. Meiklejohn, Fond du Lac..Wisconsin

—

Continental Motor Car to Make Trucks

SUPERIOR, WIS., May 20—The Continental Motor Truck Co., which has been inactive for almost a year, has completed arrangements for equipping a new shop building, and expects to be in regular production of commercial cars within 60 days. The company was organized in 1913 by J. G. Barnesdale, designer of the truck.

—

Perfex Radiator Increases Capital

RACINE, May 20—The Perfex Radiator Co. has increased its capital stock from $15,000 to $1,000,000.

—

Cantilever Tire Changes Name

MILWAUKEE, May 20—The Cantilever Airless Tire Co. has changed its corporate style to the National Airless Tire Co.

—

American Truck Buys Illinois Plant

KANKAKEE, ILL., May 21—The American Truck & Aeroplane Co. has bought the plant of the Unifile Co. at Riverview, Ill., and will equip it for the manufacture of commercial vehicles and airplanes.

Wright-Martin Purchases Old General Vehicle Plant

NEW YORK, May 18—The Wright-Martin Aircraft Corp. has purchased the old General Vehicle plant in Long Island City which early this year was reported to have been purchased by the United States Government and which for some time has been used in the production of airplane parts. The Wright-Martin Corp. will place orders for equipment amounting to $1,500,000 and it is expected that its installation will be completed within three weeks and that the plant will be operating at maximum capacity. In that time about 8000 men will be employed. The principal unit of the new plant is a six-story building, 200 x 600 ft.; a smaller unit 120 x 300 ft. is two stories and there are three additional buildings.

—

Dearborn Truck in Larger Plant

CHICAGO, May 21—The Dearborn Truck Co. has moved to a larger plant on West Thirty-Fifth Street. This is a 3-story brick building with a large yard and private switch track. The ground-space is 60,000 sq. ft. and more than quadruples the old plant on Campbell Avenue.

—

2500 Republic Trucks a Month

ALMA, MICH., May 21—The Republic Motor Truck Co. is manufacturing trucks at the rate of 2200 a month. In addition, 10 trucks are being made daily for the government, making the total monthly output 2500.

—

Overland Re-elects Officers and Directors

TOLEDO, May 18—At the annual stockholders' meeting of the Willys-Overland Co. the following directors and officers were re-elected respectively: John N. Willys, C. A. Earl, James E. Kepperley, Edwin B. Jackson, C. O. Miniger, Royal R. Scott, F. K. Dolbeer, Edward F. Swift and Rathmun Fuller.

President, John N. Willys; first vice-president, C. A. Earl; vice-president in charge of sales, Edwin B. Jackson; vice-president in charge of production, C. O. Miniger; vice-president and counsel, James E. Kepperley; vice-president, Isaac Kinsey; secretary, Royal R. Scott; treasurer, F. K. Dolbeer.

—

Five New Members for M. & A. M. A.

NEW YORK, May 20—Five new members were admitted to the Motor and Accessory Manufacturers Assn. at the meeting held last week. These are:

Indiana Lamp Co., Connersville, Ind.
Teeter-Hartley Motor Corp., Hagerstown, Md.
Mayo Radiator Co., New York City.
John W. Brown Mfg. Co., Columbus, Ohio.
G & O Mfg. Co., New Haven, Conn.

—

Regal Sale Fixed for June 26

DETROIT, May 20—All assets of the Regal Motor Car Co. will be sold June 26 at public sale. The service department will be offered as a going business.

Men of the Industry

Changes in Personnel and Position

Burch Resigns as Signal President—Joins Clyde Cars

A. C. Burch has resigned as president of the Signal Motor Truck Co. and has been elected vice-president in charge of sales and director of the Clyde Cars Corp., Clyde, Ohio.

—

J. H. Barnett has been appointed advertising manager of the Parry Mfg. Co., Indianapolis. He was formerly connected with the advertising departments of the Prest-O-Lite Co., the Swinehart Tire & Rubber Co., and the Firestone Tire & Rubber Co.

—

Fred J. Miner, formerly connected with the Oldsmobile and Cadillac companies, has been appointed district representative of the Duplex Truck Co., Lansing, Mich. His territory consists of the southeastern states.

—

B. C. Swinehart has been appointed manager of the motor truck tire department of the Hewitt Rubber Co., Buffalo, N. Y.

—

Walter Bauer, a vice-president of the American Chicle Co., has been elected president of the Pyrene Mfg. Co., New York.

—

F. J. Kidd, for the last 5 years secretary and treasurer of the Racine Mfg. Co., Racine, Wis., has resigned from the company, and has become associated with the Racine Tool & Machine Co., Racine, as general manager and assistant treasurer.

—

G. T. Purdy, formerly connected with the purchasing department of the King Motor Car Co., Detroit, has received the commission of Lieutenant in the Signal Corps of the United States Reserve.

—

Frank R. Kern has been appointed office manager of the General Motors Export Co., New York. He has been associated with the Willys-Overland Co. for the last 6 years, at one time acting as their Australasian representative.

—

C. V. Thomas has been promoted from assistant sales manager of the F. B. Stearns Co., Cleveland, to general sales manager of the company.

—

C. C. Thomas has been appointed sales engineer of the Denby Motor Truck Co., Detroit, with which he has been associated for the past 3 years as experimental engineer and service manager.

—

J. W. Fitzgerald, former president of the Detroit Starter Co., who later became president of the Versal Products Co., Detroit, has been appointed consulting and experimental engineer for the L. A. Young Industries, Inc., Detroit.

—

A. W. Bolton has been appointed district representative of the Imperial Oil Co., St. Louis. His headquarters will be in Chicago.

—

A. J. Brechell has succeeded Custer Ramsby as manager of the Studebaker Corporation branch at Des Moines. Mr. Brechell is from the South Bend office. Mr. Ramsby has gone to Detroit.

—

James F. Bourquin, chief of production for the Motor Transport Section of the Quartermaster Corps under Christian Girl, has completed his work for the government, and is now associated with the Continental Motors Corp., Detroit.

—

Leopold E. Nosiman has been appointed production manager of the Traffic Motor Truck Corp., St. Louis. He was formerly superintendent of the Chevrolet branch plant in St. Louis.

—

W. B. Kanis, formerly treasurer and general manager of the New Era Springs & Specialty Co., Grand Rapids, has been appointed sales representative of the Advance Automobile Accessories Corp., Chicago.

—

N. E. Wahlberg, chief engineer of the Nash Motors Co., Kenosha, has received the commission of major in the Quartermaster Corps of the United States Army. He has already reported to Washington, and will go overseas within a fortnight.

—

Bert M. Pettit, advertising manager of the J. I. Case Plow Works, Racine, has been elected secretary and a director of the Wallis Tractor Co., Racine. He was formerly advertising manager of the J. I. Case T. M. Co.

—

E. M. Ford has resigned as sales manager of the National Coil Co. and has become associated with the Webster Electric Co., Racine, in a similar capacity.

—

Victor Clark Parker, formerly manager of the technical department of the Buick Motor Co., Flint, Mich., has received the commission of major, in charge of the industrial headquarters of the Motor Mechanics Regiment of the Aviation Section. He will be stationed at Camp Greene.

—

To Survey Industrial Resources

WASHINGTON, May 20—Charles A. Otis, president of the Cleveland Chamber of Commerce, was appointed to-day by the War Industries Board to make a survey of the industrial resources of the country.

New Companies Formed

Latest Additions to Ranks of Automotive Industries

Crescent Company to Make Automotive Brass Bearings

SUPERIOR, WIS., May 20—The Crescent Brass Foundry Co. has been organized here, and has opened a brass and bronze foundry at 1116 North Third Street. The owners are A. A. Williams, formerly of the Duluth Gas Engine Works, and Gustave B. Erickson, formerly of the Duluth Brass Works. The new company will make a general line of automotive and marine brass and bronze goods.

—

General Motors Plans New Plant

SAGINAW, MICH., May 21—The General Motors Co. will immediately begin construction of a new plant here. It will be located half a mile north of the company's property now known as the Peninsular Shell Co. Eight hundred men will be employed when the plant is in operation.

—

Wisconsin Aluminum Adds

MANITOWOC, WIS., May 20 — The Wisconsin Aluminum Foundry Co. has purchased a two-story factory building adjoining its present plant, and will install new equipment at once.

—

Factory Buildings for Lavine Gear

MILWAUKEE, May 20—The Lavine Gear Co., Racine, has purchased a large tract of land here and will erect a group of factory buildings as soon as possible.

—

New Plant for Bohn Foundry

DETROIT, May 20—The Charles B. Bohn Foundry Co. is constructing a new one-story plant, which will have a capacity for turning out 40,000 to 50,000 lb. of castings daily. It is expected the plant will be in operation early in June and will be completed about July 1. The company will produce a general line of jobbing brass, bronze and aluminum castings.

—

Ables-Lally to Sell Power Maker

NEW YORK, May 21—The Ables-Lally Light Corp. of this city, Newark, N. J., and Boston, will distribute the "Power Maker," a machine having rollers driven by the rear wheels of a car and in turn driving a pulley from which power is derived. This mechanism, which is manufactured by the Versal Products Mfg. Co., was formerly styled Versal Mobilpower converter. The machine will also be sold by dealers in agricultural implements and farm machinery as well as automobile distributers. The list price will be $37.50.

Industrial Review of the Week

A Summary of Major Developments in Other Fields

Expect Little Steel for Non-War Uses This Year

The sudden conference at Washington last Friday between the War Industries Board and leading steel makers was continued by a joint committee in an all-day session in New York on Monday. The main differences of opinion as to the absorption of the full steel output by the Government turn on the time factor.

If all the steel in the surprising total made up by the War Board can be applied to ship, projectile, track, car, locomotive, farm implement, oil well, structural and other war uses in the specified delivery period, there is no escape from the conclusion that little steel can be had for ordinary consumption this year.

Important among the price adjustments announced on May 21 was a $6 per ton advance on cast iron water pipe, a reduction of 25c. per 100 lb. for structural and ship rivets and 15c. for boiler rivets (a differentiation now being made) and a reduction of about 5 per cent on smaller rivets. Copper bearing low phosphorus pig iron was advanced $2 per ton.

The April volume of fabricated structural steel business was 115,000 tons, or 30,000 tons more than in March, but the bridge and building shops have taken work over the last six months at an average rate no higher than 123,000 tons, against a capacity of 180,000 tons per month and these six months' bookings followed a lean period of half a year averaging 82,000 tons a month.—*Iron Age.*

Packard Gives Women Complete Mechanical Training

(*Continued from page* 988)

form. A new one is added before they leave the school to enter the shop. So when the students are ready for the regular factory production they are equipped with two uniforms, which they are obliged to keep clean, either themselves or leave with the company to wash. Women must at all times be neat. The garments are furnished without any charge, but when the workers leave the employ the uniforms must be returned. All wornout uniforms are replaced with new ones.

Are Graduated When Fit

Unlike regular school procedure, women are graduated from the school as early as they are fit, rather than leaving at specified intervals. The following is the usual method: From the requisitions for help that are sent to the employment department, the head of the school is advised of what help is needed. These requisitions are usually sent in 3 days in advance of the time the help is required. When these requests arrive at the school, the most promising students are chosen for the positions stipulated and for the following three days are drilled in the work they are to undertake.

The element of time is early impressed on the students. Throughout the course the importance of this is not lost sight of. In the school the women work on the same time schedule as the shop men —that is, 7 a. m. to 5 p. m.—and are paid 24 cents an hour at the start. All the work in the plant is based on a certain time standard. If the work can be completed within a shorter period the worker is entitled to a premium. The same privileges are granted the students. For instance, if a certain job takes 4 hours to complete and the student consumes only 3 hours she has cut her time 25 per cent, thereby being entitled to 25 per cent of her rate additional as a premium. Records show that women are earning 30 per cent premium on an average. When the women enter the regular production the same rate of pay is maintained, but as soon as they show their increased worth they are advanced accordingly.

The rest rooms, twenty in number, the company makes clear, are for only two purposes—to furnish a place for the women to change their clothes and to provide a space for those who suddenly become ill. They are not intended as a general loafing place.

Great stress is laid upon deportment while the women are in the training school. They are taught how to conduct themselves in the factory, and their education covers the proper care of tools and machines, personal neatness and general deportment, all of which make for a well-managed factory.

Trade Acceptances

(*Continued from page* 998)

ance which is sometimes raised with this question:

"Why not use promissory notes and sight drafts instead of introducing the trade acceptance into our commercial structure?"

The answer is, because it has been for years the prevailing practice to use promissory notes or sight drafts as a last resort before taking legal measures in collecting past-due accounts and unpaid loans, and so the use of either promissory notes or sight drafts is interpreted by business houses as a reflection on their credit, whereas there should be no such feeling against the trade acceptance, as the acceptance will be offered only to buyers in good credit standing.

To the buyer who generally takes advantage of the cash premium or discount the trade acceptance will be found of advantage occasionally in dull times.

The trade acceptance system would practically eliminate overdue accounts, and, if legal proceedings are necessary, a trade acceptance is much better than an open book account, because the seller has an acknowledgment in writing of the correctness of the account.

The trade acceptance, in effecting prompt payments, would reduce loss by bad debts and would save the interest on overdue accounts.

The trade acceptance would curtail or end the bad practice of taking unearned or unauthorized discounts. It would curb the unfair practice of returning merchandise after shipment has been made. It would tend to stop the pernicious practice of assigning or hypothecating book accounts to secure working capital. The Federal Reserve Bank, recognizing the advantages of the trade acceptance, has authorized special low rates of discount for this class of paper.

The seller will have paper more acceptable to his bank for discount than when he offers his single-name paper. Even if he does not need to rediscount at certain periods of the year, he can always feel that he is fortified against emergencies or sudden business depression by having in his safe, instead of accounts receivable, acceptances which can be discounted easily.

The use of the trade acceptance enables a house to determine with some degree of accuracy what its income will be from week to week, and is much more satisfactory, avoiding the disappointment which quite often occurs when a house which usually pays promptly does not do so.

To Investigate Coal Conservation Measures

The necessity of keeping American industry going at high speed with the supply of coal that will be available this year has led to the inauguration by the Fuel Administration of a fuel-conservation movement in power plants. By the correction of firing and operating methods in industrial plants Dr. Garfield hopes to save at least 25,000,000 tons of coal. Each power plant is to be inspected by engineers appointed by the Fuel Administration. While no mention has been made to this effect, it is probable that plants with the lowest ratings will be the first to be cut off when there is not enough coal to go around.

Coal production is barely keeping pace with the demand for fuel needed for immediate consumption. Some few plants here and there are accumulating reserve stocks, but a lack of sufficient storage space will prevent many from laying in much larger supplies.

Anthracite production is now at its maximum. The April shipments amounted to 6,368,872 tons, an increase of 776,074 tons over the corresponding month of 1917.—*Coal Age.*

55 Contracts Awarded by Ordnance Department

WASHINGTON, May 17—Following is a list of contracts and purchase orders included in the awards placed by the Ordnance Department on May 11, 1918:

Keystone Vehicle Co., Reading, Pa.; tops for drivers' seats, trucks.

Champion Ignition Co., Flint, Mich.; spark plugs.

Buda Co., Chicago, Ill.; gauges.

Watervliet, Watervliet, N. Y., Arsenal; spare and replacement parts, tools for accessories.

Keystone Mfg. Co., Buffalo, N. Y.; wrenches.

Colt's patent Fire Arms Mfg. Co., Hartford, Conn., aircaft modification.

Hale & Kilburn Corp., Philadelphia, Pa.; dies and tools.

Ford Motor Co., Detroit, Mich.; work on steel helmets.

Crane Co., Chicago, Ill.; miscellaneous equipment for artillery repair trucks.

Greenfield Tap & Die Corp., Greenfield, Mass.; pipe tools, plates, automobile screws.

Dunbar Mfg. Co., Chicago, Ill.; equipment for tractors.

American Car & Foundry Co., Berwick, Pa.; changing artillery repair truck to equipment truck.

American Truss Wheel Co., Chicago, Ill.; caterpillar wheels and caterpillar chain.

Ford Motor Co., Detroit, Mich.; tractors.

Variety Mfg. Co., Chicago, Ill.; mount bodies on chassis.

L. S. Starret Co., Athol, Mass.; tools.

Ford Motor Co., Detroit, Mich.; repair parts for trucks.

Four Wheel Drive Auto Co., Clintonville, Wis.; spare parts for truck chassis.

Clark Equipment Co., Buchanan, Mich.; steel wheels.

Weidmann Machine Co., Philadelphia, Pa.; valve pockets.

Sargent & Co., New Haven, Conn.; linings and safeties, bomb release traps.

William Hutcheson, Baltimore, Md.; aeroplane.

L. S. Starret Co., Athol, Mass.; equipment for tool-room truck.

Nash Motors Co., Kenosha, Wis.; tool boxes.

Detroit Steel Casting Co., Detroit, Mich.; cast steel wheels.

Van Cleef Bros., Chicago, Ill., tire cement.

Hale & Kilburn Corp., Philadelphia, Pa.; material, labor and space for storage and assembly of equipment repair trucks on chassis.

National Electrical Supply Co., Washington, D. C.; lamps.

Tacony Steel Co., Philadelphia, Pa.; annealed steel forgings.

Four Wheel Drive Auto Co., Clintonville, Wis.; bearing and housing parts, etc.

Motor Products Corp., Detroit, Mich.; machining of shell.

The Electric Storage Battery Co., Philadelphia, Pa.; storage battery.

Electric Service Supplies Co., Philadelphia, Pa.; lights and supporting brackets for lights.

The Hold Mfg. Co., Stockton, Cal.; license to make vehicles and parts.

Columbus Auto Brass Co., Columbus, Ohio; filling pipes.

F. S. Bowser & Co., Inc., Washington, D. C.; oil storage tank battery.

Ford Motor Co., Detroit, Mich.; drill jigs.

Studebaker Corp., Detroit, Mich.; replacement parts for artillery.

Nash Motor Co., Kenosha, Wis.; miscellaneous parts for repair of trucks.

Four Wheel Drive Auto Co., Clintonville, Wis.; differential, without pinion shaft.

Pfister & Vogel Leather Co., Milwaukee, Wis.; leather.

Four Wheel Drive Auto Co., Clintonville, Wis.; top water pipe.

Hale & Kilburn Corp., Philadelphia, Pa.; pressing armor.

Holt Mfg. Co., Peoria, Ill.; parts for caterpillar.

The Fairbanks Co., New York City; miscellaneous machinery and tools.

The Nash Motors Co., Kenosha, Wis.; miscellaneous machine parts.

Weimann Bros. Mfg. Co., Derby, Conn.; gauges.

Presto Machine Works, Brooklyn, N. Y.; gauges.

Stewart Wire Wheel Corp., Frankford, Ind.; machine work on cast steel wheels.

Holt Mfg. Co., Peoria, Ill.; caterpillar trailer.

Nash Motor Co., Kenosha, Wis.; quad truck.

American Truss Wheel Co., Chicago, Ill.; wheel units.

Elyria Enameled Products Co., Elyria, Ohio; tanks.

Pyrene Mfg. Co., Washington, D. C.; fire extinguishers.

—

Coke Transportation Improves

WASHINGTON, May 20—There has been a greatly improved movement of coke to furnaces and foundries within the past two weeks. This is due to the combined effort of the United States Fuel Administration, the Railroad Administration and coke-oven operators. The more important war industries are better supplied with coke than they have been at any time since last October.

—

Government Leases Testing Field

DETROIT, May 20—A tract of ground one-half mile square, located near the Lincoln Motor Co. and the Fisher Body Corp. plants, has been leased by the government for testing airplanes. The land was offered to the government without charge, but it insisted on paying for it.

Quartermaster Purchases to Be Made in 13 Depots

WASHINGTON, May 19—The Quartermaster Department has designed its own system for control of purchases of quartermaster supplies. Territory has been allotted to 13 general supply depots located at various points. Each supply depot quartermaster will be charged with the duty of ascertaining manufacturing possibilities of his zone.

This plan will allow for an equitable allocation of purchases and, as far as possible, equipment for troops at the various camps will be purchased in the zone in which the camp is located. Each supply depot quartermaster will also recommend the employment of such producers as he believes are qualified to fulfill contracts. Each depot will be kept informed as to market conditions. Purchases will be made, after advertisement, by open competitive bidding whenever time permits. A record of bids received and awards made will be open to public inspection.

Location of Zones

The states included in the zones assigned to the 13 supply depots are as follows:

Boston General Supply Depot—Maine, New Hampshire, Vermont, Massachusetts and Rhode Island.

New York Depot—New York, Connecticut and New Jersey, north of Trenton.

Philadelphia Depot—New Jersey south of Trenton and Pennsylvania.

Baltimore Depot—Maryland, Virginia and Delaware.

Atlanta Depot—North Carolina, South Carolina, Georgia, Florida and Alabama.

Jeffersonville, Ind., Depot—Ohio, West Virginia, Indiana south of Indianapolis, Kentucky and Tennessee.

Chicago Depot—Indiana north of Indianapolis, Michigan, Wisconsin, Minnesota, North Dakota, South Dakota, Illinois except territory south of Jacksonville, Springfield, Decatur, and Iowa east of Des Moines and Fort Dodge.

St. Louis Depot—Missouri, Illinois south of Jacksonville, Springfield and Decatur, Kansas, Oklahoma and Arkansas.

New Orleans Depot—Louisiana and Mississippi.

Fort Sam Houston Depot—Texas.

Omaha Depot—Iowa from Des Moines, Fort Dodge and west; Nebraska, Colorado, Utah and Wyoming.

El Paso Depot—New Mexico and Arizona.

San Francisco Depot—California, Oregon, Washington, Idaho and Montana.

Calendar

RACING

May 30—Avon, N. Y. Community Race.
May 30—Sheepshead Bay, N. Y. Championship races. Harkness Trophy.
June 22 — Chicago. Chicago Speedway.
July 4—Cincinnati. Cincinnati Speedway.

ASSOCIATIONS

June 3-4 — Chicago. National Gas Engine Assn. Eleventh Annual. Hotel Sherman.
June 5-12—Hot Springs, Va., National Assn. Automobile & Accessory Jobbers.
June 17-19—Dayton, O., Society Automotive Engineers, Annual Midsummer Session.

SHOWS

Sept. 23-28—Chicago, National Accessory Show for Fords. Coliseum.
Oct. 14-27—Dallas, Tex. Seventh Annual Texas Automobile Show. Texas State Fair.

ENGINEERING

June 26-28 — Buffalo, N. Y. American Society of Heating and Ventilating Engineers.
Sept. 2 — Cripple Creek, Colo. American Institute of Mining Engineers.
Nov. 14-15—New York. Society of Naval Architects and Marine Engineers. Twenty-sixth general meeting. Engineering Societies Bldg., 29 West 39th Street.